PATENT
Customer No. 22,852
Attorney Docket No. 08686.0005-00000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
David MUCHOW et al.	Group Art Unit: 2836
Application No.: 10/661,816	Examiner: H. Kaplan
Filed: September 15, 2003	Confirmation No.: 7360
For: MOBILE POWER SYSTEM	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. § 1.131

We, David J. Muchow, George F. Bockelmann, Michael C. Hull, and Charles J. Bigelow state that we are the named applicants of the above-identified application and are co-inventors of the subject matter described and claimed therein. Prior to July 17, 2002, we completed in this country the invention as described and claimed in the above-identified application as evidenced by the following:

1. In an Office Action mailed February 28, 2006, the U.S. Patent and Trademark Office rejected certain previously pending claims of the above-identified application by applying International Patent Publication No. WO 03/008803 to Pas ("Pas") as prior art. The effective date of the Pas reference under 102(e) is July 17, 2002.

2. Prior to July 17, 2002, we conceived of the mobile power station inventions described and claimed at least in the pending independent claims of the above-identified application. That conception occurred in the United States. Our conception prior to July 17, 2002, is evidenced by at least a document titled "SkyBuilt Product Line" attached as Exhibit 1, a page of sketches and notes attached as Exhibit 2, a technical drawing attached as Exhibit 3, a photograph attached as Exhibit 4, and an e-mail from George F. Bockelmann to David J. Muchow attached as Exhibit 5.

3. The document reproduced as Exhibit 1 was written and prepared by David J. Muchow. The sketches and notes reproduced as Exhibit 2 and the technical drawing reproduced as Exhibit 3 were prepared by George F. Bockelmann. The photograph reproduced as Exhibit 4 shows a full-sized structural model of an embodiment of the mobile power station constructed with the direction of David J. Muchow and George F. Bockelmann. The e-mail reproduced as Exhibit 5 was written and prepared by George F. Bockelmann. The document, sketches and notes, technical drawing, photograph, and e-mail reproduced as Exhibits 1-5 were written and prepared during the course of conceiving and developing inventions related to the mobile power station. Exhibits 1-5 are true and accurate copies of the document titled "SkyBuilt Product Line," the sketches and notes, the technical drawing, the photograph, and the e-mail kept by us. The documents reproduced as Exhibits 1-3 and 5 and the model shown in Exhibit 4 were created prior to July 17, 2002.

4. Exhibit 1 refers to the basic unit components including a structure that includes solar panels connected to the top of a storage container and an electronics pack including batteries and an inverter that converts DC to AC power (Exhibit 1, Basic

Unit Components § 1 and 3). A solar unit "[s]hips in container and is easy to pull out, make operational and put back in" and is used with the electronics pack (Exhibit 1, Models § 1.1 and 1.3). The unit may be used to supply "[i]nstant power in rugged areas, all climates, [and] temperatures" and for "Homeland Security and overseas applications" (Exhibit 1, Models § 1.2).

5. Exhibit 2 illustrates and describes a bracket and a cable for attaching to the solar panels and "a wind turbine adapter."

6. Exhibit 3 illustrates a corner post assembly with fittings that may be attached to a modified freight container to connect the power generating devices such as a wind turbine.

7. Exhibit 4 shows a partial view of a full-sized structural model of the mobile power station including a modified freight container and solar panels supported by cables and a mock-up support structure made of wood. The model also included mock-ups made of wood for the corner post assemblies that support wind turbines.

8. Exhibit 5 describes how "all of the pieces [such as, for example, the wind turbines and solar panels] fit together (plug and play) in addition to securely packed inside the container to withstand the shock loads" and that "the batteries will need to be stowed separately within the container away from the electronics...."

9. We have reviewed pending claims 65 and 142-175 of the above-identified application. A copy of the pending claims is attached as Exhibit 6.

10. Exhibits 1-5 describe and show embodiments of the inventions set forth in the pending claims of this patent application (Exhibit 6). Exhibits 1-5 describe the method of transporting and assembling a power station set forth in independent claim

65, the transportable power station set forth in independent claim 156, and the method of producing and delivering power at a desired location as set forth in independent claim 172. In particular, the product line description in Exhibit 1, the sketches and notes in Exhibit 2, the technical drawing in Exhibit 3, the model shown in Exhibit 4, and the description in Exhibit 5 identify and show at least the following features of the independent claims of the invention:

Independent claim 65

a) Storing a plurality of power generating devices and a plurality of coupling components within a housing, the plurality of power generating devices including at least two different types of power generating devices: Exhibit 1, Models § 1.1; Exhibit 2; Exhibit 5.

b) Transporting the housing to a desired location: Exhibit 1, Models § 1.2.

c) Removing the plurality of power generating devices and the plurality of coupling components from within the housing: Exhibit 1, Models § 1.1.

d) Coupling the plurality of power generating devices to an outer surface of the housing using the plurality of coupling components: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

e) Receiving power from the plurality of power generating devices: Exhibit 1, Basic Unit Components § 3 and Models § 1.2-1.3; Exhibit 2; Exhibit 5.

f) Providing access to the received power: Exhibit 1, Basic Unit Components § 3; Exhibit 2; Exhibit 5.

Independent claim 156

a) A transportable housing: Exhibit 1, Models § 1.2, Exhibit 4.

b) A plurality of power generating devices removably coupled from respective operational positions on an outside surface of the housing using a plurality of coupling components: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

c) The plurality of power generating devices and the plurality of coupling components being sized to fit completely within the transportable housing: Exhibit 1, Models § 1.1; Exhibit 5.

d) The plurality of power generating devices including at least two different types of power generating devices: Exhibit 2.

Independent claim 172

a) Coupling a wind power generating device to an outer surface of a transportable housing, the transportable housing being a modified freight container: Exhibit 2; Exhibit 3; Exhibit 4.

b) Coupling a solar power generating device to the outer surface of the transportable housing: Exhibit 1, Basic Unit Components § 1; Exhibit 2; Exhibit 3; Exhibit 4.

c) Coupling the wind and solar power generating devices to the outer surface of the transportable housing using a plurality of coupling components, the

plurality of coupling components including at least one vertical pole: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

d) Coupling the at least one pole to at least one corner of the transportable housing: Exhibit 3; Exhibit 4.

e) Coupling the wind power generating device to the at least one pole: Exhibit 2; Exhibit 3; Exhibit 4.

f) Receiving power from the wind and solar power generating devices: Exhibit 1, Basic Unit Components § 3 and Models § 1.2-1.3; Exhibit 2; Exhibit 5.

g) Detaching the wind and solar power generating devices from the transportable housing: Exhibit 1, Models § 1.1.

h) Storing the wind and solar power generating devices and the plurality of coupling components within the transportable housing, the storing includes storing substantially all components necessary to couple the wind and solar power generating devices to the outer surface of the transportable housing: Exhibit 1, Models § 1.1; Exhibit 5.

i) Transporting the transportable housing to a desired location: Exhibit 1, Models § 1.2.

11. We exercised diligence relating to the invention described and claimed in the above-identified application at least from just prior to July 17, 2002, to September 13, 2002, the filing date of U.S. Provisional Patent Application Serial No. 60/410,300 to which the above-identified application claims priority. A copy of the U.S. provisional

patent application is attached as Exhibit 7. The U.S. provisional patent application includes text and drawings that fully support independent claims 65, 156, and 172. We were in the process of refining the design of the mobile power station and preparing the U.S. provisional patent application during this approximately two-month period from just prior to July 17, 2002, to September 13, 2002.

12. In each of the attached Exhibits, the applicable dates and nonrelevant information have been redacted for confidentiality reasons.

We declare further that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further, that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.

Dated: 10/7/06 By: David J Muchow
David J. Muchow

Dated: _____ By: _____
George F. Bockelmann

Dated: _____ By: _____
Michael C. Hull

Dated: _____ By: _____
Charles J. Bigelow

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6. Exhibit 3 illustrates a corner post assembly with fittings that may be attached to a modified freight container to connect the power generating devices such as a wind turbine.

7. Exhibit 4 shows a partial view of a full-sized structural model of the mobile power station including a modified freight container and solar panels supported by cables and a mock-up support structure made of wood. The model also included mock-ups made of wood for the corner post assemblies that support wind turbines.

8. Exhibit 5 describes how "all of the pieces [such as, for example, the wind turbines and solar panels] fit together (plug and play) in addition to securely packed inside the container to withstand the shock loads" and that "the batteries will need to be stowed separately within the container away from the electronics...."

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65, the transportable power station set forth in independent claim 156, and the method of producing and delivering power at a desired location as set forth in independent claim 172. In particular, the product line description in Exhibit 1, the sketches and notes in Exhibit 2, the technical drawing in Exhibit 3, the model shown in Exhibit 4, and the description in Exhibit 5 identify and show at least the following features of the independent claims of the invention:

Independent claim 65

a) Storing a plurality of power generating devices and a plurality of coupling components within a housing, the plurality of power generating devices including at least two different types of power generating devices: Exhibit 1, Models § 1.1; Exhibit 2; Exhibit 5.

b) Transporting the housing to a desired location: Exhibit 1, Models § 1.2.

c) Removing the plurality of power generating devices and the plurality of coupling components from within the housing: Exhibit 1, Models § 1.1.

d) Coupling the plurality of power generating devices to an outer surface of the housing using the plurality of coupling components: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

e) Receiving power from the plurality of power generating devices: Exhibit 1, Basic Unit Components § 3 and Models § 1.2-1.3; Exhibit 2; Exhibit 5.

f) Providing access to the received power: Exhibit 1, Basic Unit Components § 3; Exhibit 2; Exhibit 5.

Independent claim 156

a) A transportable housing: Exhibit 1, Models § 1.2, Exhibit 4.

b) A plurality of power generating devices removably coupled from respective operational positions on an outside surface of the housing using a plurality of coupling components: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

c) The plurality of power generating devices and the plurality of coupling components being sized to fit completely within the transportable housing: Exhibit 1, Models § 1.1; Exhibit 5.

d) The plurality of power generating devices including at least two different types of power generating devices: Exhibit 2.

Independent claim 172

a) Coupling a wind power generating device to an outer surface of a transportable housing, the transportable housing being a modified freight container: Exhibit 2; Exhibit 3; Exhibit 4.

b) Coupling a solar power generating device to the outer surface of the transportable housing: Exhibit 1, Basic Unit Components § 1; Exhibit 2; Exhibit 3; Exhibit 4.

c) Coupling the wind and solar power generating devices to the outer surface of the transportable housing using a plurality of coupling components, the

plurality of coupling components including at least one vertical pole: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

d) Coupling the at least one pole to at least one corner of the transportable housing: Exhibit 3; Exhibit 4.

e) Coupling the wind power generating device to the at least one pole: Exhibit 2; Exhibit 3; Exhibit 4.

f) Receiving power from the wind and solar power generating devices: Exhibit 1, Basic Unit Components § 3 and Models § 1.2-1.3; Exhibit 2; Exhibit 5.

g) Detaching the wind and solar power generating devices from the transportable housing: Exhibit 1, Models § 1.1.

h) Storing the wind and solar power generating devices and the plurality of coupling components within the transportable housing, the storing includes storing substantially all components necessary to couple the wind and solar power generating devices to the outer surface of the transportable housing: Exhibit 1, Models § 1.1; Exhibit 5.

i) Transporting the transportable housing to a desired location: Exhibit 1, Models § 1.2.

11. We exercised diligence relating to the invention described and claimed in the above-identified application at least from just prior to July 17, 2002, to September 13, 2002, the filing date of U.S. Provisional Patent Application Serial No. 60/410,300 to which the above-identified application claims priority. A copy of the U.S. provisional

patent application is attached as Exhibit 7. The U.S. provisional patent application includes text and drawings that fully support independent claims 65, 156, and 172. We were in the process of refining the design of the mobile power station and preparing the U.S. provisional patent application during this approximately two-month period from just prior to July 17, 2002, to September 13, 2002.

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David J. Muchow

Dated: 10/14/06 By: George F. Bockelmann
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Dated: _____ By: _____
Michael C. Hull

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Charles J. Bigelow

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5. Exhibit 2 illustrates and describes a bracket and a cable for attaching to the solar panels and "a wind turbine adapter."

6. Exhibit 3 illustrates a corner post assembly with fittings that may be attached to a modified freight container to connect the power generating devices such as a wind turbine.

7. Exhibit 4 shows a partial view of a full-sized structural model of the mobile power station including a modified freight container and solar panels supported by cables and a mock-up support structure made of wood. The model also included mock-ups made of wood for the corner post assemblies that support wind turbines.

8. Exhibit 5 describes how "all of the pieces [such as, for example, the wind turbines and solar panels] fit together (plug and play) in addition to securely packed inside the container to withstand the shock loads" and that "the batteries will need to be stowed separately within the container away from the electronics...."

9. We have reviewed pending claims 65 and 142-175 of the above-identified application. A copy of the pending claims is attached as Exhibit 6.

10. Exhibits 1-5 describe and show embodiments of the inventions set forth in the pending claims of this patent application (Exhibit 6). Exhibits 1-5 describe the method of transporting and assembling a power station set forth in independent claim

65, the transportable power station set forth in independent claim 156, and the method of producing and delivering power at a desired location as set forth in independent claim 172. In particular, the product line description in Exhibit 1, the sketches and notes in Exhibit 2, the technical drawing in Exhibit 3, the model shown in Exhibit 4, and the description in Exhibit 5 identify and show at least the following features of the independent claims of the invention:

Independent claim 65

a) Storing a plurality of power generating devices and a plurality of coupling components within a housing, the plurality of power generating devices including at least two different types of power generating devices: Exhibit 1, Models § 1.1; Exhibit 2; Exhibit 5.

b) Transporting the housing to a desired location: Exhibit 1, Models § 1.2.

c) Removing the plurality of power generating devices and the plurality of coupling components from within the housing: Exhibit 1, Models § 1.1.

d) Coupling the plurality of power generating devices to an outer surface of the housing using the plurality of coupling components: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

e) Receiving power from the plurality of power generating devices: Exhibit 1, Basic Unit Components § 3 and Models § 1.2-1.3; Exhibit 2; Exhibit 5.

f) Providing access to the received power: Exhibit 1, Basic Unit Components § 3; Exhibit 2; Exhibit 5.

Independent claim 156

a) A transportable housing: Exhibit 1, Models § 1.2, Exhibit 4.

b) A plurality of power generating devices removably coupled from respective operational positions on an outside surface of the housing using a plurality of coupling components: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

c) The plurality of power generating devices and the plurality of coupling components being sized to fit completely within the transportable housing: Exhibit 1, Models § 1.1; Exhibit 5.

d) The plurality of power generating devices including at least two different types of power generating devices: Exhibit 2.

Independent claim 172

a) Coupling a wind power generating device to an outer surface of a transportable housing, the transportable housing being a modified freight container: Exhibit 2; Exhibit 3; Exhibit 4.

b) Coupling a solar power generating device to the outer surface of the transportable housing: Exhibit 1, Basic Unit Components § 1; Exhibit 2; Exhibit 3; Exhibit 4.

c) Coupling the wind and solar power generating devices to the outer surface of the transportable housing using a plurality of coupling components, the

plurality of coupling components including at least one vertical pole: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

d) Coupling the at least one pole to at least one corner of the transportable housing: Exhibit 3; Exhibit 4.

e) Coupling the wind power generating device to the at least one pole: Exhibit 2; Exhibit 3; Exhibit 4.

f) Receiving power from the wind and solar power generating devices: Exhibit 1, Basic Unit Components § 3 and Models § 1.2-1.3; Exhibit 2; Exhibit 5.

g) Detaching the wind and solar power generating devices from the transportable housing: Exhibit 1, Models § 1.1.

h) Storing the wind and solar power generating devices and the plurality of coupling components within the transportable housing, the storing includes storing substantially all components necessary to couple the wind and solar power generating devices to the outer surface of the transportable housing: Exhibit 1, Models § 1.1; Exhibit 5.

i) Transporting the transportable housing to a desired location: Exhibit 1, Models § 1.2.

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Michael C. Hull

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65, the transportable power station set forth in independent claim 156, and the method of producing and delivering power at a desired location as set forth in independent claim 172. In particular, the product line description in Exhibit 1, the sketches and notes in Exhibit 2, the technical drawing in Exhibit 3, the model shown in Exhibit 4, and the description in Exhibit 5 identify and show at least the following features of the independent claims of the invention:

Independent claim 65

a) Storing a plurality of power generating devices and a plurality of coupling components within a housing, the plurality of power generating devices including at least two different types of power generating devices: Exhibit 1, Models § 1.1; Exhibit 2; Exhibit 5.

b) Transporting the housing to a desired location: Exhibit 1, Models § 1.2.

c) Removing the plurality of power generating devices and the plurality of coupling components from within the housing: Exhibit 1, Models § 1.1.

d) Coupling the plurality of power generating devices to an outer surface of the housing using the plurality of coupling components: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

e) Receiving power from the plurality of power generating devices: Exhibit 1, Basic Unit Components § 3 and Models § 1.2-1.3; Exhibit 2; Exhibit 5.

f) Providing access to the received power: Exhibit 1, Basic Unit Components § 3; Exhibit 2; Exhibit 5.

Independent claim 156

a) A transportable housing: Exhibit 1, Models § 1.2, Exhibit 4.

b) A plurality of power generating devices removably coupled from respective operational positions on an outside surface of the housing using a plurality of coupling components: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

c) The plurality of power generating devices and the plurality of coupling components being sized to fit completely within the transportable housing: Exhibit 1, Models § 1.1; Exhibit 5.

d) The plurality of power generating devices including at least two different types of power generating devices: Exhibit 2.

Independent claim 172

a) Coupling a wind power generating device to an outer surface of a transportable housing, the transportable housing being a modified freight container: Exhibit 2; Exhibit 3; Exhibit 4.

b) Coupling a solar power generating device to the outer surface of the transportable housing: Exhibit 1, Basic Unit Components § 1; Exhibit 2; Exhibit 3; Exhibit 4.

c) Coupling the wind and solar power generating devices to the outer surface of the transportable housing using a plurality of coupling components, the

plurality of coupling components including at least one vertical pole: Exhibit 1, Basic Unit Components § 1.2 and Models § 1.1; Exhibit 2; Exhibit 3; Exhibit 4.

d) Coupling the at least one pole to at least one corner of the transportable housing: Exhibit 3; Exhibit 4.

e) Coupling the wind power generating device to the at least one pole: Exhibit 2; Exhibit 3; Exhibit 4.

f) Receiving power from the wind and solar power generating devices: Exhibit 1, Basic Unit Components § 3 and Models § 1.2-1.3; Exhibit 2; Exhibit 5.

g) Detaching the wind and solar power generating devices from the transportable housing: Exhibit 1, Models § 1.1.

h) Storing the wind and solar power generating devices and the plurality of coupling components within the transportable housing, the storing includes storing substantially all components necessary to couple the wind and solar power generating devices to the outer surface of the transportable housing: Exhibit 1, Models § 1.1; Exhibit 5.

i) Transporting the transportable housing to a desired location: Exhibit 1, Models § 1.2.

11. We exercised diligence relating to the invention described and claimed in the above-identified application at least from just prior to July 17, 2002, to September 13, 2002, the filing date of U.S. Provisional Patent Application Serial No. 60/410,300 to which the above-identified application claims priority. A copy of the U.S. provisional

patent application is attached as Exhibit 7. The U.S. provisional patent application includes text and drawings that fully support independent claims 65, 156, and 172. We were in the process of refining the design of the mobile power station and preparing the U.S. provisional patent application during this approximately two-month period from just prior to July 17, 2002, to September 13, 2002.

12. In each of the attached Exhibits, the applicable dates and nonrelevant information have been redacted for confidentiality reasons.

We declare further that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further, that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.

Dated: _____ By: _____
David J. Muchow

Dated: _____ By: _____
George F. Bockelmann

Dated: _____ By: _____
Michael C. Hull

Dated: 10/16/06 By: _____
Charles J. Bigelow

EXHIBIT 1

SkyBuilt Product Line

Basic Unit Components

1. **Solar panels or shingles plus support structure**
   1.1. For stand alone units, this includes structure to hold panels plus legs
   1.2. For units combined with storage containers, this includes:
      4.2.1. Structure to hold panels
      4.2.2. A structure to connect to the top of the storage container
2. **Electrical wiring designed for quick connections/disconnections**
3. **Electronics Pack for:**
   1.1. Electrical controls
   1.2. Inverter (DC to AC)
   1.3. Batteries – optional on some models
      4.3.1. Easily removable for replacement of whole unit
   1.4. Remote telecommunications controls
   1.5. Easy but secure access to components for repairs/replacement

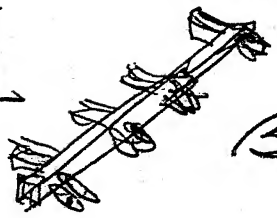
Models

1. **HS-1 Hardened solar unit to be placed on top of storage container**
   1.1. Ships in container and is easy to pull out, make operational and put back in – "Plug and Play" concept
   1.2. Uses:
      1.2.1 Instant power in rugged areas, all climates, temperatures
      1.2.1 Homeland Security and overseas applications
      1.2.1 Outdoor backup and peak shaving power with storage for commercial use
      1.2.1 Linked together for solar farms
   1.3. With Electronics Pack – removable for replacement of whole

EXHIBIT 2

Skybuilt

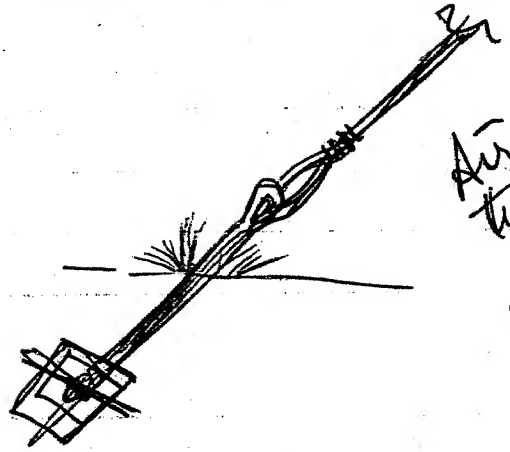
#1



Bracket to extend Panels outward

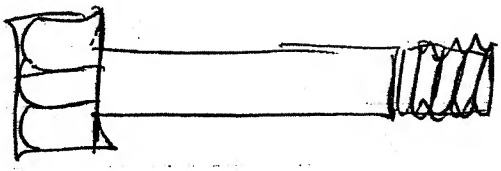
50 Kw Unit

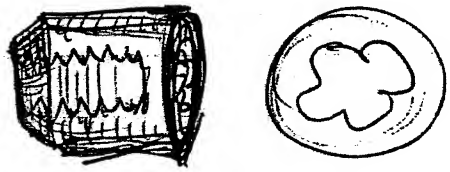
#3 ~~tie~~ Down Cable - ends Mfg.



Airplane tye Down

#2



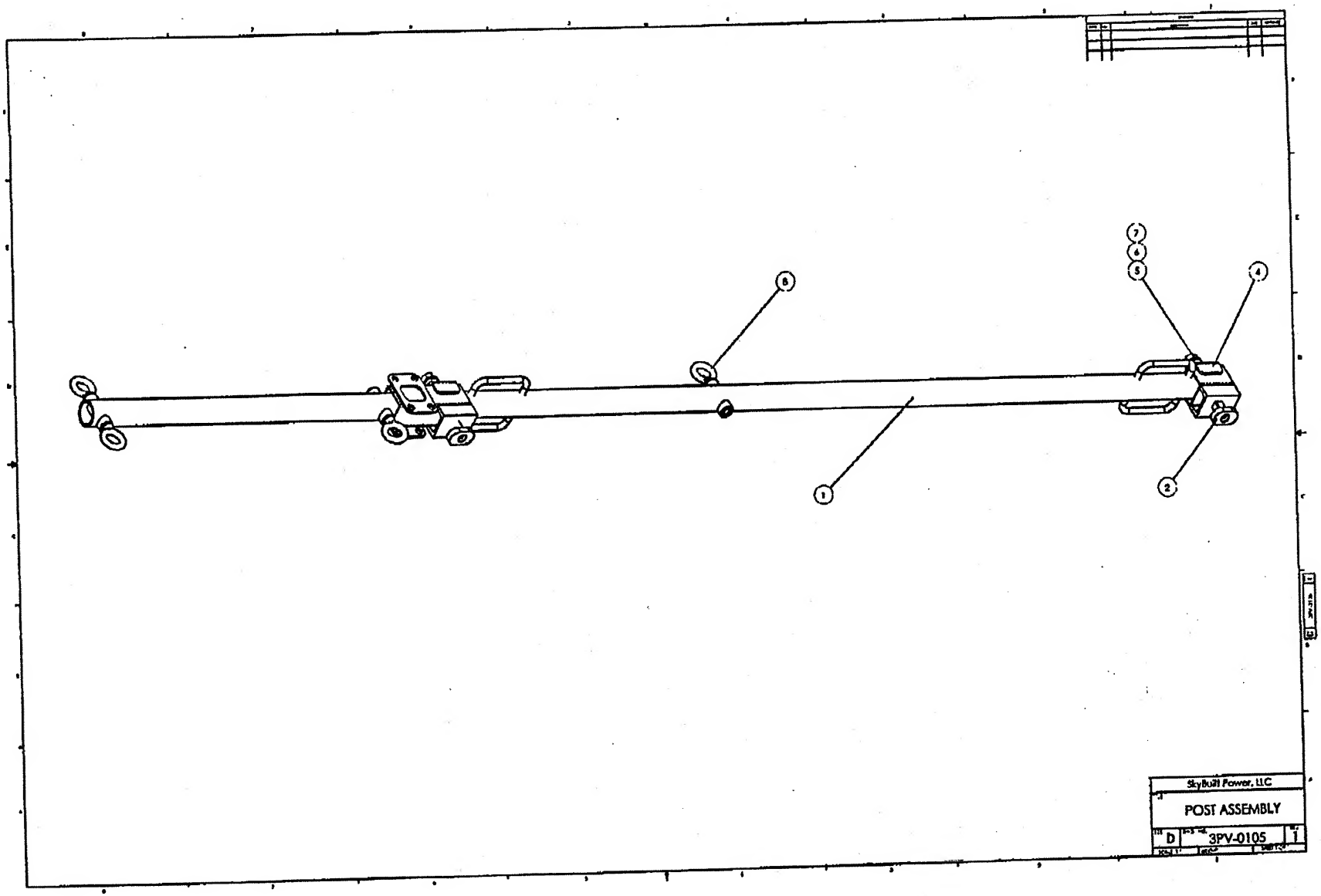


'Lug' Nut w/ tool

tamper Resistant Pivot Assy

Wind turbine adapter - Later - -

EXHIBIT 3



Power Post Ass. 02

EXHIBIT 4

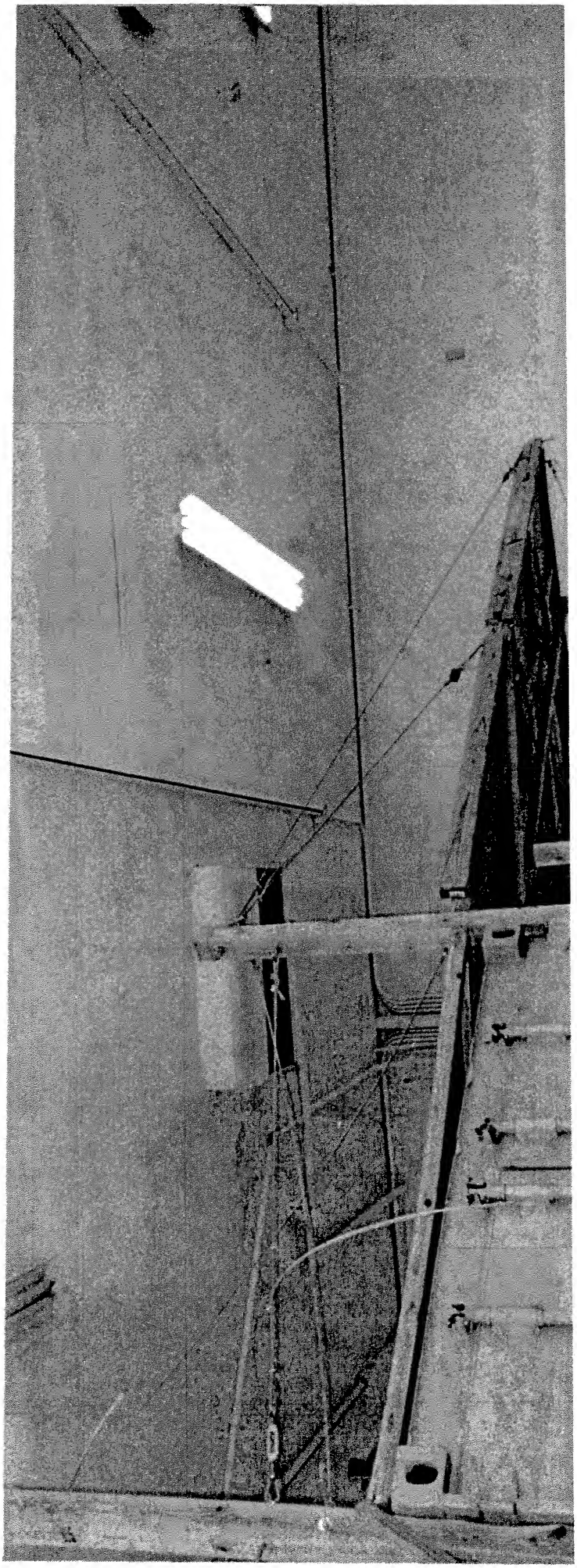


EXHIBIT 5

(1)

George F. Bockelmann

From: "George F. Bockelmann" <mr_bock@mindspring.com>
To: <dmuchow@erols.com>

Subject: Re: FW: Batteries - Scott

David:

Such as how all of the pieces fit together (plug and play) in addition to securely packed inside the container to withstand the shock loads. I think the batteries will need to be stowed separately within the container away from the electronics (they are very heavy).

Sincerely,

George F. Bockelmann
Electro-Pack Company

EXHIBIT 6

PENDING CLAIMS

65. A method of transporting and assembling a power station, comprising:

storing a plurality of power generating devices and a plurality of coupling components within a housing, the plurality of power generating devices including at least two different types of power generating devices;

transporting the housing to a desired location;

removing the plurality of power generating devices and the plurality of coupling components from within the housing;

coupling the plurality of power generating devices to an outer surface of the housing using the plurality of coupling components;

receiving power from the plurality of power generating devices; and

providing access to the received power.

142. The method of claim 65, further including accessing the received power in a plurality of different electrical configurations.

143. The method of claim 65, wherein the coupling of the plurality of power generating devices to the outer surface of the housing includes modifying the housing from a shipping condition in which the housing has a plurality of substantially flush outer sides.

144. The method of claim 65, wherein the housing is a modified standard ISO freight container.

145. The method of claim 65, further including detaching the plurality of power generating devices and coupling components from the housing to create a shipping condition of the housing that includes substantially flush outer housing sides.

146. The method of claim 65, wherein the storing of the plurality of power generating devices and the plurality of coupling components within the housing includes storing substantially all components necessary to couple the plurality of power generating devices to the outer surface of the housing.

147. The method of claim 65, further including utilizing the housing as a human shelter.

148. The method of claim 65, wherein the coupling of the plurality of power generating devices to the outer surface of the housing includes coupling a proximal end of at least one adjustable strut to one of the power generating devices and positioning a distal end of the at least one adjustable strut on the ground.

149. The method of claim 65, wherein at least one of the coupling components includes at least one vertical pole coupled to a corner of the housing.

150. The method of claim 149, wherein the coupling of each power generating device to the outer surface of the housing includes attaching the at least one pole to a support located at the corner of the housing.

151. The method of claim 149, wherein the coupling of the plurality of power generating devices to the outer surface of the housing includes coupling at least one supplemental pole to the at least one pole, the at least one pole and the at least one supplemental pole being separated by a predetermined distance.

152. The method of claim 151, wherein the coupling of the plurality of power generating devices to the outer surface of the housing includes coupling a wind power generating device to each at least one pole and at least one supplemental pole.

153. The method of claim 65, wherein:

at least one of the power generating devices is a solar power generating device including first and second arrays of solar panels; and

the coupling of the plurality of power generating devices to the outer surface of the housing includes coupling the second array of solar panels to the housing via the first array of solar panels.

154. The method of claim 65, further including providing equipment for remotely controlling and monitoring at least one of the power generating devices.

155. The method of claim 65, wherein:

the plurality of power generating devices includes at least one of a wind power generating device and a solar power generating device; and

the coupling of the plurality of power generating devices to the outer surface of the housing includes coupling the at least one of the wind power generating device and the solar power generating device to the housing to extend in at least four different directions from the housing.

156. A transportable power station, comprising:

a transportable housing; and

a plurality of power generating devices removably coupled from respective operational positions on an outside surface of the housing using a plurality of coupling components, the plurality of power generating devices and the plurality of coupling components being sized to fit completely within the transportable housing, and the plurality of power generating devices including at least two different types of power generating devices.

157. The transportable power station of claim 156, further including a plurality of different electrical outlets providing access to power in a plurality of different electrical configurations.

158. The transportable power station of claim 156, wherein the housing includes a shipping condition wherein the housing has a plurality of substantially flush sides.

159. The transportable power station of claim 158, wherein the housing is a modified standard ISO freight container.

160. The transportable power station of claim 156, wherein substantially all components necessary to couple the plurality of power generating devices to the outside surface of the housing are sized to fit completely within the housing.

161. The transportable power station of claim 156, wherein the transportable housing is a human shelter.

162. The transportable power station of claim 156, further including at least one adjustable strut including a proximal and distal end, the proximal end being coupled to one of the power generating devices, and the distal end being positioned on the ground.

163. The transportable power station of claim 156, wherein at least one of the coupling components includes at least one vertical pole coupled to a corner of the housing.

164. The transportable power station of claim 163, wherein the at least one pole is attached to a support located at the corner of the housing.

165. The transportable power station of claim 164, wherein the support is a support pillar located at the corner of the housing.

166. The transportable power station of claim 163, further including at least one supplemental pole coupled to the at least one pole, the at least one pole and the at least one supplemental pole being separated by a predetermined distance.

167. The transportable power station of claim 166, wherein the plurality of power generating devices includes a wind power generating device is coupled to each at least one pole and at least one supplemental pole.

168. The transportable power station of claim 156, wherein at least one of the power generating devices is a solar power generating device including first and second arrays of solar panels, the second array of solar panels being coupled to the housing via the first array of solar panels.

169. The transportable power station of claim 156, wherein the plurality of power generating devices are coupled to at least three surfaces of the housing.

170. The transportable power station of claim 169, wherein:

the plurality of power generating devices includes at least one of a wind power generating device and a solar power generating device; and

the at least one of the wind power generating device and the solar power generating device extends in at least four different directions from the housing.

171. The transportable power station of claim 156, further including equipment for remotely controlling and monitoring at least one of the power generating devices.

172. A method of producing and delivering power at a desired location, comprising:

coupling a wind power generating device to an outer surface of a transportable housing, the transportable housing being a modified freight container;

coupling a solar power generating device to the outer surface of the transportable housing;

the coupling of the wind and solar power generating devices to the outer surface of the transportable housing includes:

coupling the wind and solar power generating devices to the outer surface of the transportable housing using a plurality of coupling components, the plurality of coupling components including at least one vertical pole,

coupling the at least one pole to at least one corner of the transportable housing, and

coupling the wind power generating device to the at least one pole;

receiving power from the wind and solar power generating devices;

detaching the wind and solar power generating devices from the transportable housing;

storing the wind and solar power generating devices and the plurality of coupling components within the transportable housing, the storing includes storing substantially all components necessary to couple the wind and solar power generating devices to the outer surface of the transportable housing; and

transporting the transportable housing to a desired location.

173. The method of claim 172, further including providing access to the received power in a plurality of different electrical configurations.

174. The method of claim 172, further including utilizing the transportable housing as a human shelter.

175. The method of claim 172, wherein the coupling of the wind and solar power generating devices to the outer surface of the housing includes coupling the wind and solar power generating devices to the housing to extend in at least four different directions from the housing.

EXHIBIT 7

United States Provisional Patent Application

of

David J. Muchow et al.

for

PORTABLE SOLAR POWER STATION

Field of the Invention

The present invention relates generally to portable sources of power, and more specifically to a mobile, self-contained, solar power station (SPS).

Background

While electric power from traditional electrical grids is readily available in many locations throughout the world, there remain vast regions where no electric power is available. Even in locations where electric power is available, there are a variety of situations where a supplemental or substitute power source would be desirable.

Solar power generation devices are known and may be applied in many different applications. Traditional solar power generation devices, however, have several shortcomings. For example, these devices have not been standardized. As a result, they must be custom built for each particular application, which makes these devices expensive. Custom built solar power devices typically require days to assemble or to disassemble. Further, traditional solar power devices are not modular. Specifically, once a particular solar power generator has been designed and manufactured to include a certain number of photovoltaic devices, additional photovoltaic devices may not be added to the generator without significant difficulty including, for example redesign and modification of the solar power generator.

There currently exists a need for a standardized, modular, transportable power source to address these issues. The present invention provides a portable SPS that may convert solar and/or wind energy into electric power. The SPS is standardized and modular. As a result, custom design and manufacturing of each SPS is unnecessary. Rather, the SPS may be assembled from a stock of standardized parts to meet a

desired power output requirement. The modular nature of the SPS ensures that additional components, including the power generation components, for example, may be added to the SPS without requiring any redesign or modification of the SPS. The standardized, modular nature of the SPS enables the SPS to be at least partially assembled before the specific requirements of an end user are even known. For example, several SPS units may be assembled and inventoried. When a request for a power source of a particular power output is received from a user, one or more of the SPS units in inventory may be retrieved. Because of the modularity of the SPS components, power generation components (e.g., solar panels or arrays of solar panels) may simply be removed or added to the inventoried SPS units to meet the particular power output requirements of the user. In certain instances, an SPS may be delivered to a user and assembled such that the SPS is operational within 24 hours of the user making a request for the SPS.

The SPS of the present invention may be integrated with an standard housing to facilitate transport and to protect the components of the SPS. For example, this standard housing may include a standardized shipping container (e.g., ISO or other) or the cargo area of a vehicle. In the SPS of the present invention, the housing serves as integral component of SPS. In other words, the container not only facilitates shipment of the SPS while protecting the components of the SPS, but the container also acts as a base for the SPS upon deployment. For example, power generating devices (solar, wind, and other) may be connected to the housing along with telecommunications, lighting, sensing, radar, and other types of equipment. Further, SPS electronics, power

backup components, general use equipment (e.g., office, medical, military, laboratory, and others), and other types of equipment may be housed within the housing.

The portable SPS of the present invention may provide a power output of about 0.5 kW to about 50 kW or more and be located anywhere in the world to address the power needs of any of a wide variety of activities. For example, the power system may provide electric power for military operations in locations and situations where other forms of electric power may be unavailable or not viable. The power system may also provide power for clinics, disaster relief efforts, water pumping stations, office facilities, storage space, stand-alone buildings, emergency facilities, environmental monitoring facilities, security applications, and telecommunications facilities in a wide range of locations. Not only can the SPS provide power for these and other facilities, but the SPS may itself actually serve as any of these facilities by incorporating and integrating appropriate equipment or space within the SPS housing. The SPS may be located in remote areas where electric power is unavailable, at disaster sites, or where electric power is available but unreliable or inadequate.

The SPS may also serve as an environmentally safe source of both primary and back-up power. For example, the SPS may operate in conjunction with a traditional electric power grid to supplement power generated by other forms of energy conversion (coal, hydroelectric, nuclear, etc.). Because there are no emissions from the SPS, there would be no impact to the environment as a result of operating the SPS of the present invention. Also, the solar and/or wind power of the SPS qualifies as "green power" under government and other programs to provide incentives for increased supplies of environmentally benign power.

The SPS is designed to provide electric power for long periods of time with little maintenance. When maintenance is required, the costs would be low due to the standardized nature of the SPS.

Description of Invention

The SPS of the present invention may reside in and be integrated with an ISO standardized shipping container. For example, as shown in Fig. 1, such a shipping container may include an ISO Series 1 General Cargo Container having dimensions of approximately 20' x 8' x 8'6". Such a container and other ISO containers are widely used in the shipping industry for transporting items by ship, rail, airplane, or truck. Integrating the SPS within a standardized shipping container ensures that the SPS is easily transportable. Additionally, the shipping container provides a sturdy, protective housing for the SPS and even allows for several SPS units to be stacked on top of each other for transport. ISO containers generally include a thick support pillar arranged vertically at each corner of the container. Not only do these support pillars provide structural integrity for the containers and allow the containers to be stacked and easily moved, but they also serve as convenient attachment points for various components of the SPS. Once the SPS is delivered to a desired operating location, the shipping container functions as a weather-proof barrier to internal electronic and other types of components.

While Fig. 1 illustrates one particularly-sized ISO shipping container, the SPS may be integrated with any of a plurality of different sizes of ISO containers. Additionally, the SPS may be integrated into a custom-sized container.

Fig. 2 illustrates three different SPS external housing configurations for use with trucks. As shown in Fig. 2(a), the SPS may be incorporated into a container that is mounted on the trailer frame of a semi-type truck and trailer. The SPS container may be configured as either a component that permanently attaches to a truck or trailer, or the SPS container may be configured as a component that is removable from the truck or trailer. Additionally, as shown in Fig. 2(b), the SPS may be integrated with a smaller container that can be attached to a flat-bed truck or placed into the cargo space of a pickup truck. Further, as illustrated in Fig. 3(c), the SPS may be integrated directly with a van or similar panel-type vehicle.

Fig. 3 provides a top view of one possible layout of the SPS within its container. During transport of the SPS, the interior space of the container may be used for storage of solar panels, windmills, legs, struts, and other structural members that are assembled and mounted to the exterior of the container once the SPS has been delivered to its operating location. Designated space for an office, medical equipment, or general storage may also be included in the container.

The container may include various electronics components. For example, inside the container, one or more storage cabinets may house power inverters to convert DC solar power to AC. Other power management devices can be included for handling power input from sources including wind mills, generators, batteries, etc. Still other electronic devices in the container may include charge controllers, control systems, telecommunications systems, computer systems (including commercially available and/or custom designed software), remote control systems for remotely controlling the SPS, and alarm systems. One portion of the interior space of the container may include

an optional generator (diesel, gas, etc.) or batteries that can serve as power backup in the case of long periods without sun or wind. The container may also include exterior and/or interior lights operated by the power generated from the solar panels, windmills, generator, and/or batteries.

The walls of the container can be insulated to allow for climate control (using an optional air conditioner and/or heater unit) of the interior of the container or to protect the interior components of the SPS from external environments. The SPS may also include a set of secure, internal doors. Specifically, as shown in Fig. 3, the ISO container housing the SPS includes a set of exterior access doors. These access doors may be opened to expose one or more internal doors that may be secured. Such a feature would be useful, for example, in applications where limited access to the SPS was desired.

A panel for external, electrical connections to the SPS is mounted in the wall of the SPS container. A power strip may be mounted to the exterior of the SPS to provide auxiliary electrical connections. Fig. 4 illustrates an exemplary electrical interface panel that may be mounted to a wall of the SPS container. The electrical interface panel includes input locations for relaying electrical energy from the externally mounted wind and solar power generators to the internal SPS electrical components. The electrical interface panel also includes output locations for supplying electric power to external locations. Fig. 5 provides a list of elements that may be included on the external electrical interface panel. Fig. 6 illustrates an array of conduits associated with the external electrical interface to the SPS.

Fig. 7 provides both a front view and a side view of an SPS according to a first exemplary embodiment of the present invention. Once located at an operating location, the solar panels and other external components of the SPS may be removed from inside container 73 and mounted to the exterior of container 73. Where the SPS operates as a stand-alone unit independent of a vehicle or other mode of transport, the SPS may be anchored to the ground. While the SPS will weigh a significant amount, in some environments, such as a windy environment with winds frequently in excess of 40 mph, for example, it may be desirable to anchor the SPS to the ground or some supporting structure using a cable attached to the container.

An array of solar panels 71 may be linked together and arranged at an appropriate angle to container 73 to maximize the incident cross-section of solar rays on panels 71. The angle of orientation of solar panels 71 is adjustable and will vary with position of the SPS on the Earth (e.g., latitude and orientation of container 73 with respect to geographic north).

A corner post 74 may be attached to container 73 at each corner of the container. Specifically, a corner post 74 may be attached to each of the support pillars of the container. In the exemplary embodiment of Fig. 7, a plurality of cables 72 can be attached to solar panels 71 to support and orient the panels. In addition to solar panels 71, the SPS may also include one or more windmills 75 to supplement the power generated by solar panels 71. Upon reaching an operating location, windmills 75 may be unloaded from within container 73 and mounted to corner posts 74, for example. In addition to supporting solar panels 74 and windmills 75, corner posts 74, mounted to the support pillars of the container, may support other equipment such as, for example,

telecommunications equipment, radar, antennas, flagpoles, sensors, lights, alarms, video equipment, and various other devices.

Fig. 8 provides a close-up view of corner posts 74 and solar panels 71. Each corner post 74 may include several eyelets 81 where cables 72 can be attached. Fig. 9 illustrates eyelets 81 and corner post 74 in more detail.

Fig. 10. illustrates an array of solar panels 71 incorporated into frame 100. Each solar panel 71 may be connected to an adjacent panel using a bracket 102. Certain brackets 101 may also include holes or other fixtures for attaching supporting cables 72.

Fig. 11. illustrates an exemplary bracket for joining two corners of adjacent solar panels. Fig. 12 illustrates an exemplary bracket for joining four corners of adjacent solar panels. Figs. 13, 14, and 15 illustrate linking plates and mounting hardware that may be used for joining and supporting solar panels 71 in the first embodiment of the invention.

Figs. 16 and 17 illustrate a honeycomb panel that may be used to support solar panels 71. For instance, where solar panels 71 include an unframed, unsupported photovoltaic material, a single panel of photovoltaic material may be inserted into one cell of the illustrated honeycomb panel. The honeycomb panel may provide structural support for the photovoltaic material and function to maintain the light-receiving surfaces of adjacent solar panels 71 parallel to one another. In some cases, the photovoltaic material used in the SPS may include a factory-installed frame. In such a case, no additional honeycomb frame, as shown in Figs. 16 and 17, would be necessary to provide support for solar panels 71.

Fig. 18 illustrates an SPS container and mounting hardware according to a second exemplary embodiment of the present invention. While Fig. 18 shows an ISO Series 1 General Cargo Container having dimensions of approximately 20' x 8' x 8'6", the SPS may be integrated with any standardized cargo container of any size. Additionally, custom sized containers may be used where appropriate. The size and configuration of the container used to house the SPS may be selected based any of a wide range of criteria including, for example, desired power output, shipping requirements, and end use requirements (e.g., if the SPS is to include space for a clinic, office, laboratory, or other specialized use).

In order to support the deployed solar panels, the SPS container shown in Fig. 18 may include mounting hardware on all four edges of the top surface and on three edges of the bottom surface. While it is possible to add mounting hardware to the front, bottom edge of the container, mounting hardware in this location could interfere with operation of container doors. Fig. 19 provides perspective and plan views of a top mount bracket that may be attached to the top edges of the SPS container. The bracket is shown as including four mounting points where a support for one or more solar panels may be attached to the bracket. While four mounting points are shown, the bracket may be configured with more or less mounting points depending on a particular application.

Fig. 20 provides both a perspective and a plan view of a top end mounted bracket that may be attached to the top front and rear edges of the SPS container. Fig. 21 provides both a perspective and a plan view of a bottom mount bracket that may be attached to bottom edges of the SPS container. Like the brackets of Figs. 19 and 20,

the bottom mount bracket of Fig. 21 may include one or more mounting locations for attaching supports for solar panels of the SPS. While four mounting locations are illustrated, the bracket of Fig. 21 may be configured with more or less mounting brackets depending on a particular application.

Fig. 22 provides an end view of SPS container 220 in a configuration in which solar panels 222 of the SPS have been deployed. Instead of the supporting cable arrangement of the first embodiment of the invention, the second embodiment includes a series of struts 221 to support solar panels 222. Struts 221 can be attached to the mounting brackets along the top and bottom edges of container 220. As shown in Fig. 22, portions of solar panels 222 may be attached directly to the mounting brackets. In this way, a combination of the mounting brackets and struts 221 are used to support solar panels 222.

Fig. 23 illustrates yet another configuration of deployed solar panels in relation to the SPS container. Specifically, in addition to the array of solar panels, supporting struts, and mounting brackets shown in Fig. 22, Fig. 23 includes an additional solar panel 231 and supporting legs 230. The solar panel array of the SPS of the present invention is modular and expandable. Depending on the amount of space available for the SPS and depending on the amount of power desired for a particular application, many additional solar panels modules, and their associated supporting legs, may be added to the solar panel array.

As shown in Figs. 22 and 23, the solar panel array of the SPS is tilted at an angle. The angle of tilt is determined by the position of the SPS on the Earth as well as the orientation of the SPS with respect to geographic north. The tilt angle may be

adjusted to maximize the solar energy captured from the sun (e.g., by adjusting the tilt angle such that the solar panels are approximately normal to the incident rays of the sun). While the SPS is expandable, in certain instances, the optimal tilt angle for capturing solar energy may limit the total number of solar panels that may be added to the basic SPS configuration. Specifically, any tilt angle other than 0 degrees, as measured between the plane including the incident surfaces of the solar panels of at least one solar panel array and the top surface of the SPS container, would cause the solar panels on one side of the SPS container to intersect the ground at a certain distance from the container. Also, on the opposite side of the container, the solar panels would eventually extend to a height where the struts would no longer be structurally viable for providing the necessary support.

For example, at the equator, the tilt angle of the solar panels would be near 0 degrees. Therefore, at or near the equator, additional solar panels could extend to a great distance from the SPS container without intersecting the ground. At increasing latitudes away from the equator, the solar panels would include a non-zero tilt angle. As a result, the length of the solar panel array may be limited.

Fig. 24 illustrates a range of tilt angles on either side of the SPS container. Specifically, the tilt angle of the solar panels (measured with respect the incident surface of the solar panels) with respect to the side of the SPS container may range from about 45 degrees to about 135 degrees.

Fig. 25 illustrates the modular expansion capability of the SPS of the present invention and provides estimates of power output of the SPS based on one particular type of photovoltaic device used in the solar panels.

Fig. 26 illustrates the underside of a solar panel array assembly. For example, three solar panels are mounted together on a pair of supporting members. While C-channel support members are shown in Fig. 26, any suitably configured support member of a wide array of cross-sectional shapes may be used to join and support the solar panel arrays. Such support members are available from various manufacturers. Also, Fig. 26 illustrates a UNI-SOLAR US-64 solar panel. Other solar panels from other manufacturers may be used in the SPS of the present invention.

Fig. 27 provides a close-up view of a solar panel supporting member.

Fig. 28 provides a close-up view of the top mounting brackets as shown in Figs. 18-20. Additionally Fig. 28 illustrates a possible method for attaching the solar panels or support struts to the mounting brackets. For example, a pin may be used to engage both the holes in the mounting bracket and holes in either the solar panels or supporting struts. Fig. 29. provides a close-up view of the bottom mounting brackets as shown in Fig. 18 and Fig. 21. Fig. 29 also illustrates one possible method for attaching a supporting strut to the bottom mounting bracket. Similar to the mounting scheme illustrated in Fig. 28, the support struts may be attached to the mounting brackets using a pin that engages both holes in the mounting bracket and a hole in the supporting strut.

Fig. 30 illustrates three alternative configurations useful in making the support struts shown in Figs. 22 and 23. Specifically, the support struts may include a "C" section, a box section, or a round cross section. Other strut configurations, however, may be suitable depending on a particular application. The support struts, like much of the hardware associated with the SPS, may be made from various materials including, for example, steel and other metals, carbon fiber, and/or structural polymers.

Fig. 31 illustrates a corner post assembly that may be attached to one or more of the support pillars of the SPS container. In the first embodiment of the invention, the corner posts may include attachment points for the cables used to support the solar panels of the SPS. In both the first and second embodiments of the invention, the corner posts may be used to mount windmills for supplemental power, telecommunications equipment, sensors, and various other components.

Fig. 32 provides a close-up view of the corner post assembly. While there are many possible methods for securing the corner posts to the SPS container, Fig. 32 illustrates components that may be used to secure the corner posts to pre-existing holes included on the support pillars of certain ISO shipping containers. A pin 321 having an oval-shaped head may be located at two positions along corner post 320. Pin 321 can be rotated 90 degrees using the nut 322 located on the opposite side of corner post 320 from pin 321. The oval-shaped head of pin 321 is designed to fit within an oval hole on the support pillar of the SPS container. Once the oval head of pin 321 enters an oval hole on the support pillar, nut 322 is rotated 90 degrees to lock the corner post in place.

Pin 321, along with nut 322 and other components, for example, may be used to attach various forms of hardware and devices to the support pillars of the containers even in the case where no corner post 320 is used. Specifically, virtually any type of hardware or any device could be fitted with a connecting element including pin 321 such that the hardware or device could be attached directly to the container.

Fig. 33 provides a close-up view of pin 321, as shown in Fig. 32. Fig. 34 illustrates a guide member that may be used to align pin 321 and nut 322, as shown in Fig. 32.

One aspect of the present invention includes a method of providing electric power to a user. In this method, a plurality of portable power stations may each be integrated into a housing (e.g., a standardized ISO or other shipping container or the cargo area of a vehicle such as a truck or van) and placed in inventory. Once a request is received from the user for a quantity of portable power stations each having a desired output, a certain number of SPS units already integrated into various housings may be removed from inventory and modified to suit the power requirement needs of the user. For example, an appropriate number of modularized power generation devices (e.g., solar panels or arrays of solar panels) may be included in the housing of each of the SPS units. The SPS units are then delivered to the user and assembled by, for example, removing the modularized power generation devices from the SPS units and attaching the modularized power generation devices to the housing. Because the SPS units are standardized and modular, requests for additional power generation devices from a particular user may be easily accommodated. To increase the power output of a particular SPS, additional modularized power generation devices may be delivered to the user and simply attached to the power generation devices already installed on the SPS. Further, once a request for an SPS or additional power generation devices is received from a user, the SPS or additional power generation devices may be delivered and assembled within less than about 24 hours.

Claims

1. A transportable power station comprising:

a housing integral to the power station, and

at least one modularized power generation device attached to the housing.

2. The transportable power station of claim 1, wherein the at least one modularized power generation device includes a solar panel.

3. The transportable power station of claim 1, wherein the at least one modularized power generation device includes an array of solar panels

4. The transportable power station of claim 1, wherein the at least one modularized power generation device includes one or more windmills.

5. The transportable power station of claim 1, wherein the housing includes a standardized shipping container.

6. The transportable power station of claim 5, wherein the shipping container is a standard ISO cargo container.

7. The transportable power station of claim 5, wherein the shipping container includes support pillars located at corners of the shipping container.

8. The transportable power station of claim 7, further including one or more corner posts attached to the support pillars of the shipping container.

9. The transportable power station of claim 8, wherein the corner posts include fasteners configured to engage preexisting holes on the support pillars of the shipping container.

10. The transportable power station of claim 7, further including one or more power station components attached to the support pillars of the shipping container.

11. The transportable power station of claim 1, wherein the housing includes a cargo area of a vehicle.

12. The transportable power station of claim 1, wherein the at least one modularized power generation device is supported by one or more struts attached to the container.

13. The transportable power station of claim 12, wherein the at least one modularized power generation device and the one or more struts are secured to the container using a plurality of removable fasteners.

14. The transportable power station of claim 13, further including one or more supporting legs attached to the at least one modularized power generation device.

15. The transportable power station of claim 1, wherein the container includes an internal space for receiving the at least one modularized power generation device during transport of the power station.

16. The transportable power station of claim 1, further comprising communications and control equipment for remotely operating the power source.

17. The transportable power station of claim 1, further including at least one door located behind access doors of the container.

18. A method of providing electric power to a user, comprising:

integrating one or more portable power stations each into a housing;

receiving a request from the user for a quantity of portable power stations each having a desired output;

including within the housing of each of the quantity of portable power stations an appropriate number of modularized power generation devices to provide the desired output; and

delivering the quantity of portable power stations to the user.

19. The method of claim 18, further comprising:;

removing the modularized power generation devices from the quantity of portable power stations, and

attaching the modularized power generation devices to the housing of each of the quantity of portable power stations.

20. The method of claim 19, further comprising:

receiving a request from the user for additional modularized power generation devices;

delivering the additional modularized power generation devices to the user; and

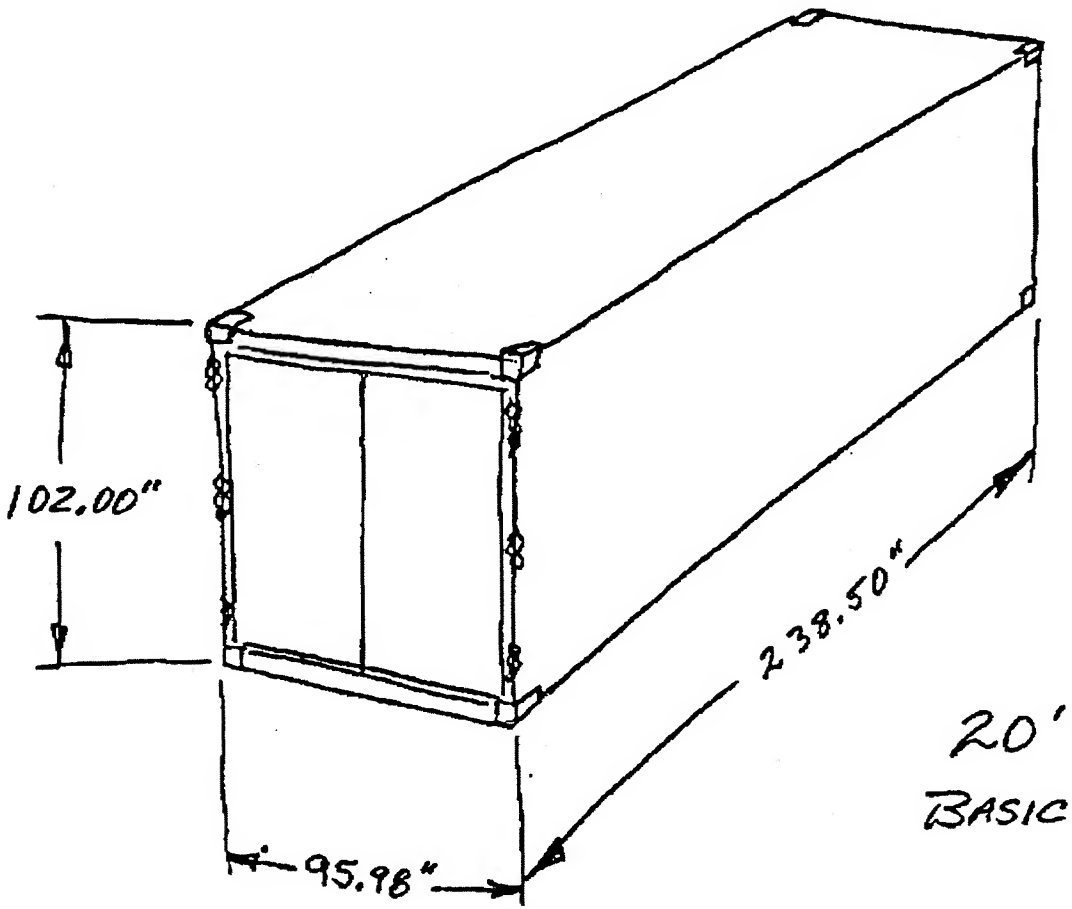
assembling the additional modularized power generation devices by connecting the additional modularized power generation devices to modularized power generation devices already attached to the housing of one or more of the quantity of portable power stations.

21. The method of claim 19, wherein the steps of receiving the request from the user to attaching the modularized power generation devices occur in less than about 24 hours.

22. The method of claim 18, wherein the housing includes a standardized shipping container.

23. The method of claim 18, wherein the housing includes a cargo area of a vehicle.

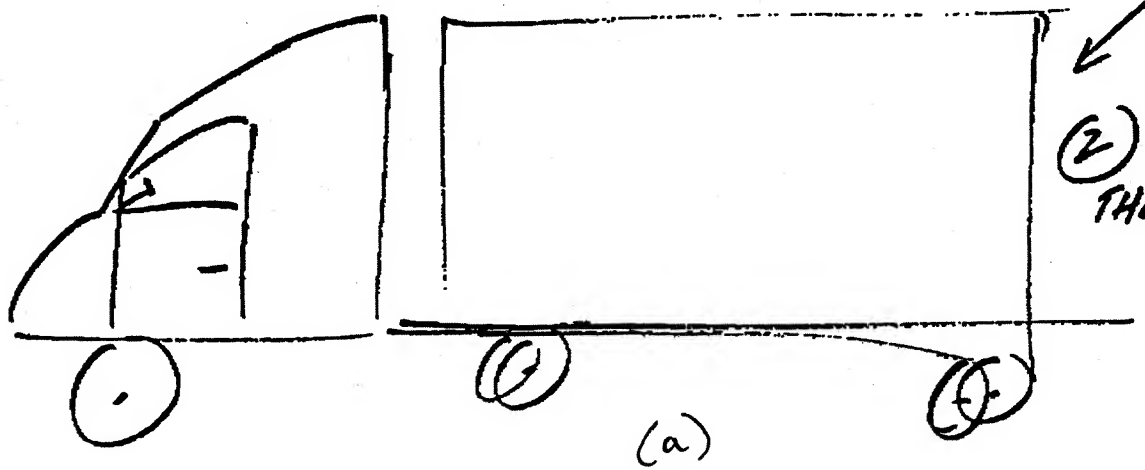
David J. Muchow 703-536-7125



20' CONTAINER
BASIC DIMENSIONS

Fig. 1

SPS EXTERNAL OPTIONS



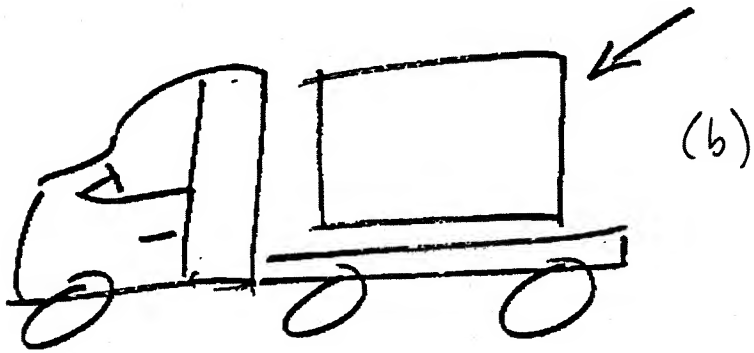
(a)

(1) STORAGE CONTAINER SPS ON TRUCK BASE

OR

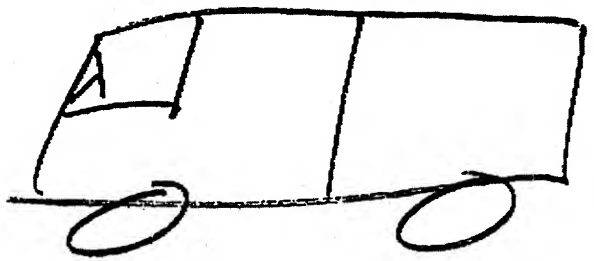
(2) THE TRUCK ITSELF USED AS THE STORAGE CONTAINER WITH ELECTRONICS, SOLAR EQUIP. INSIDE (SPS)

OR



(b)

(3) SMALLER CONTAINER ON SMALL PICKUP OR SIMILAR TRUCK/VEHICLE W/SPS



(c)

PANEL VAN OR SIMILAR VEHICLE

Fig. 2

TOP CUTAWAY VIEW OF ONE SPS CONFIGURATION

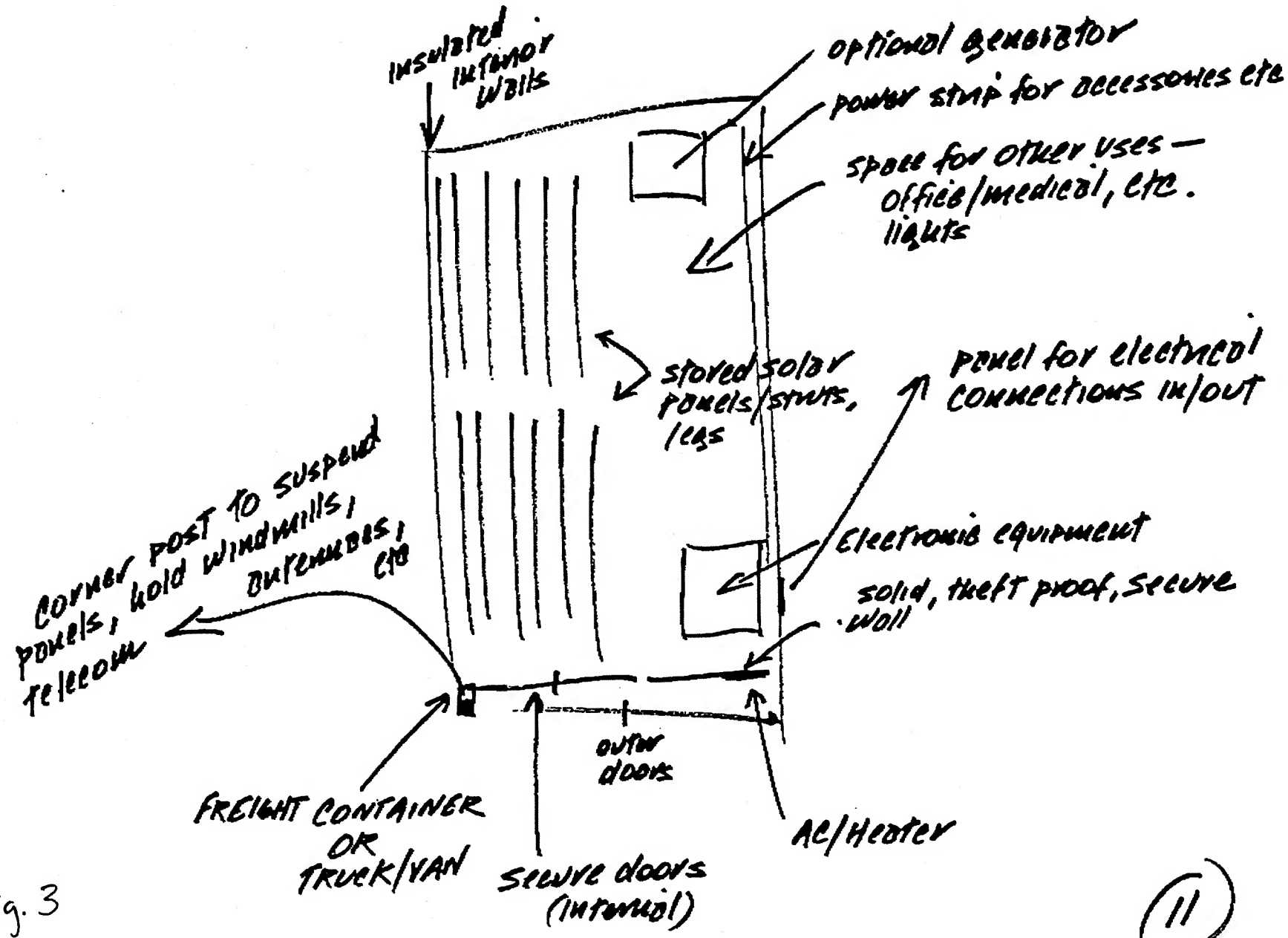


Fig. 3

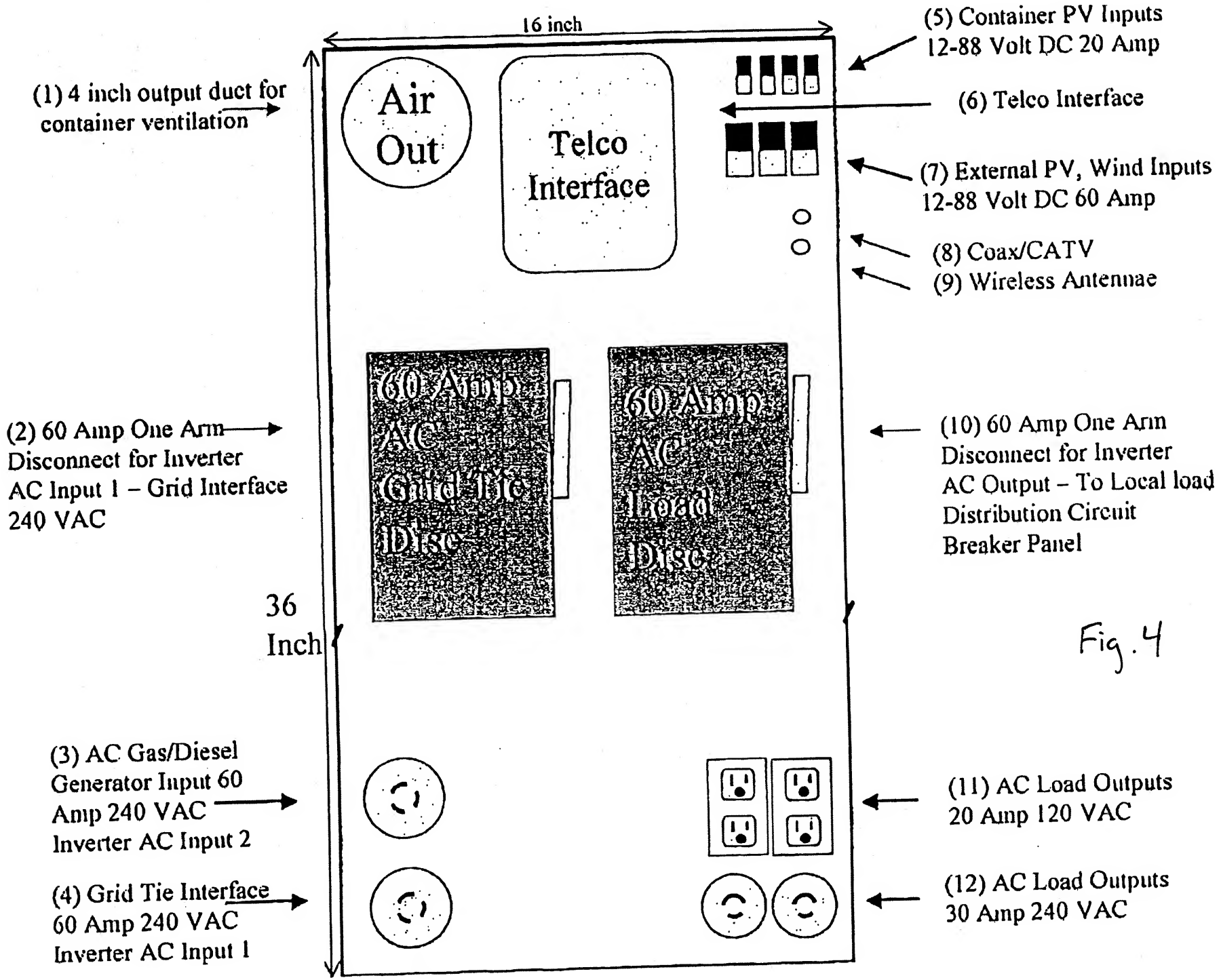


Fig. 4

David J. Murphy
703-536-7125

Skybuilt Power Container -
External Interface Panel

Item Num	Description	Quantity	Amps	Volts	Outlet	Manufacturer
1	Ventilation Output	1			4 Inch	
	AC Grid Tie Interface					
2	Disconnect Switch	1		60 240 VAC		
	AC Gas/Diesel Generator					
3	Inverter Input 2	1		60 240 AC		
	AC Grid Tie Interface					
4	Inverter Input 1	1		60 240 AC		
5	Container Solar Panel Input	4		20 12-88 DC		
	Telco Interface Provide					
	Interface Device (PID) for 2					
6	circuits	1				
7	External PV, Wind Inputs	1		60 12-88 DC		
	Wireless Phone Antennae					
8	Interface	1			Coax	
9	Cable TV Interface	1			Coax	
10	AC Load Disconnect	1		60 240 AC		
11	Outlet for AC	4		20 120 AC		
12	Outlet for AC	2		30 240 AC		

System Ground will be
located at the base of the
container and will use
separate hole

Fig. 5

Side View
Container entrance facilities
(Not to scale)

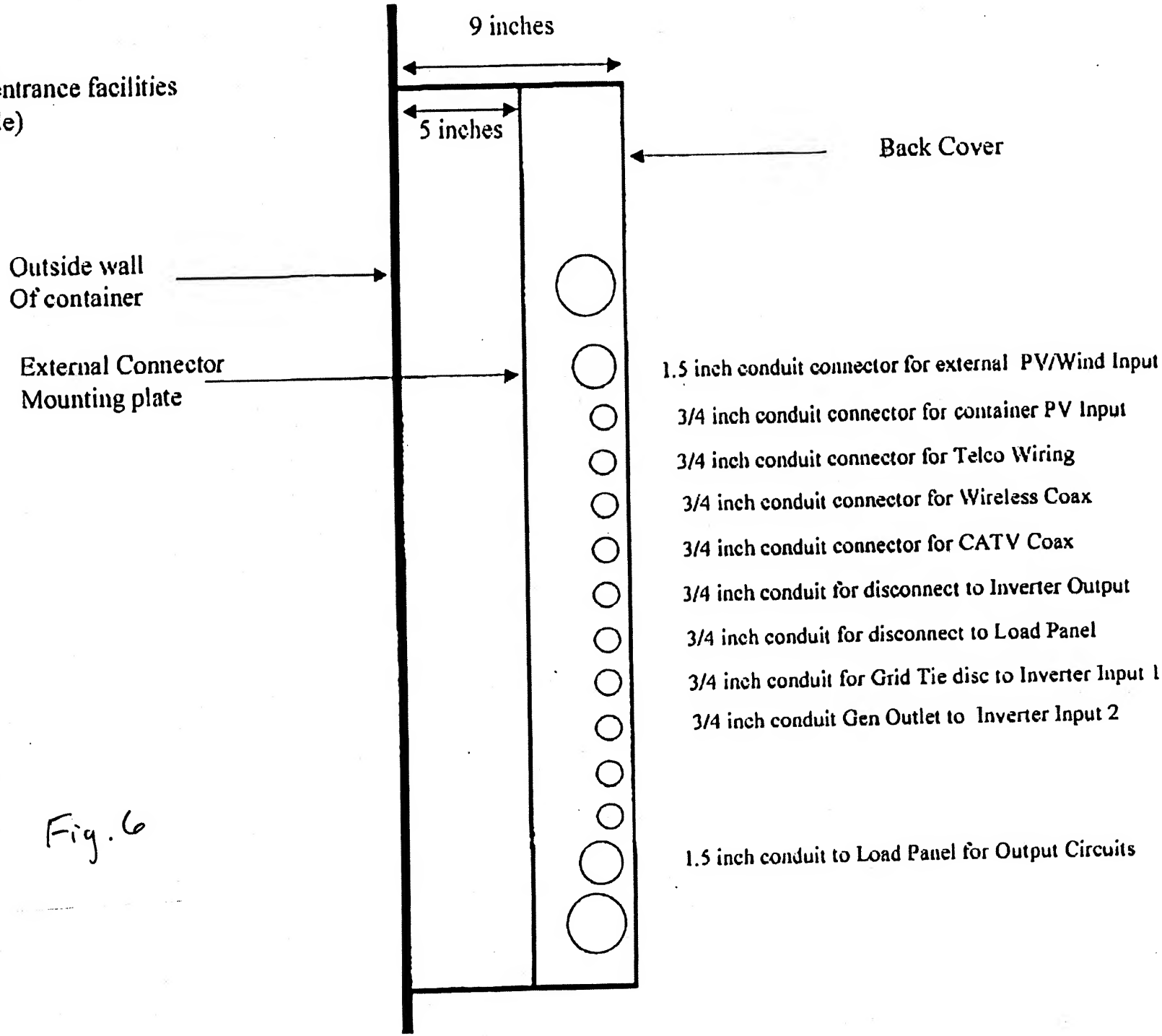


Fig. 6

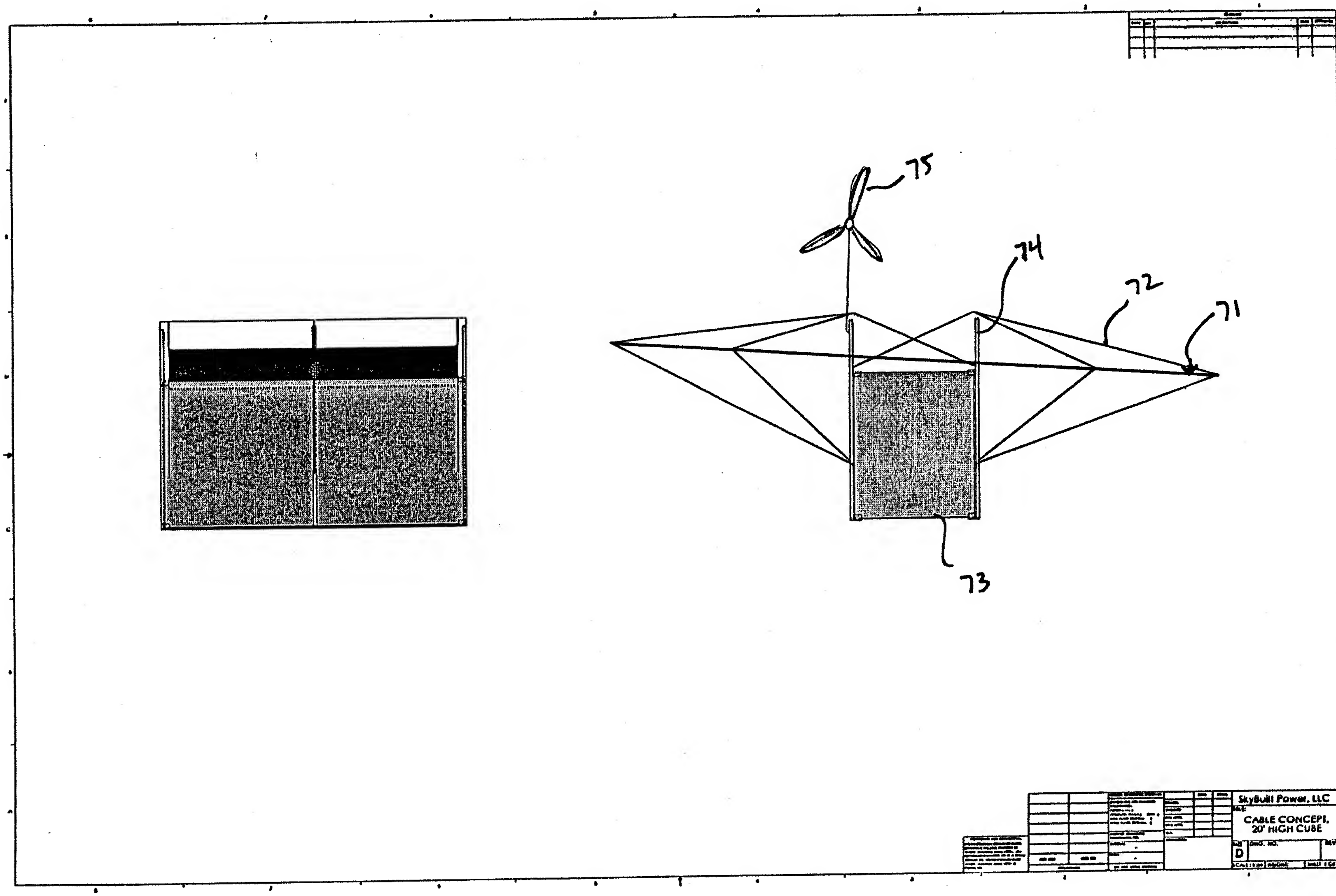


Fig. 7

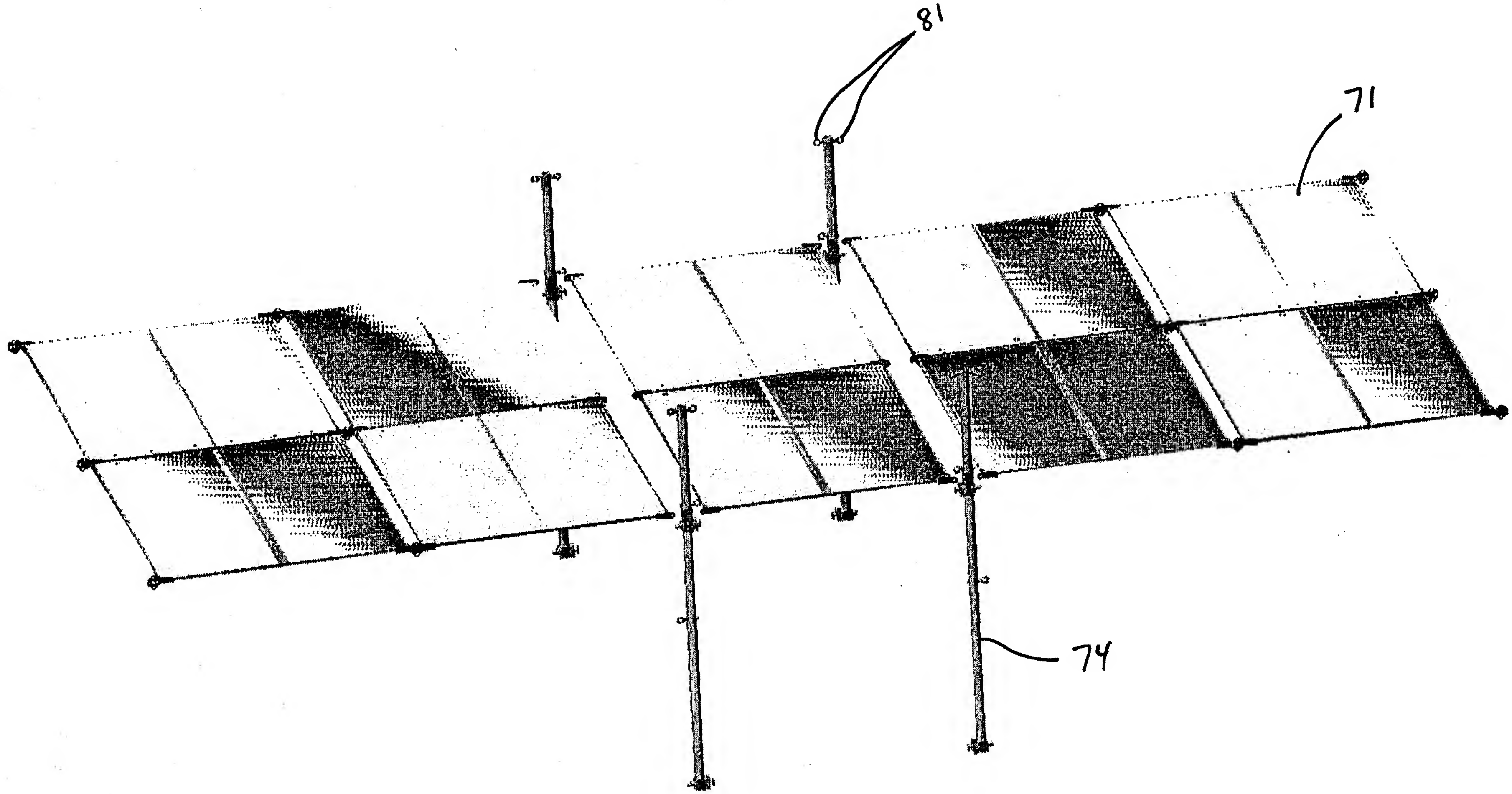


Fig. 8

Fig. 9

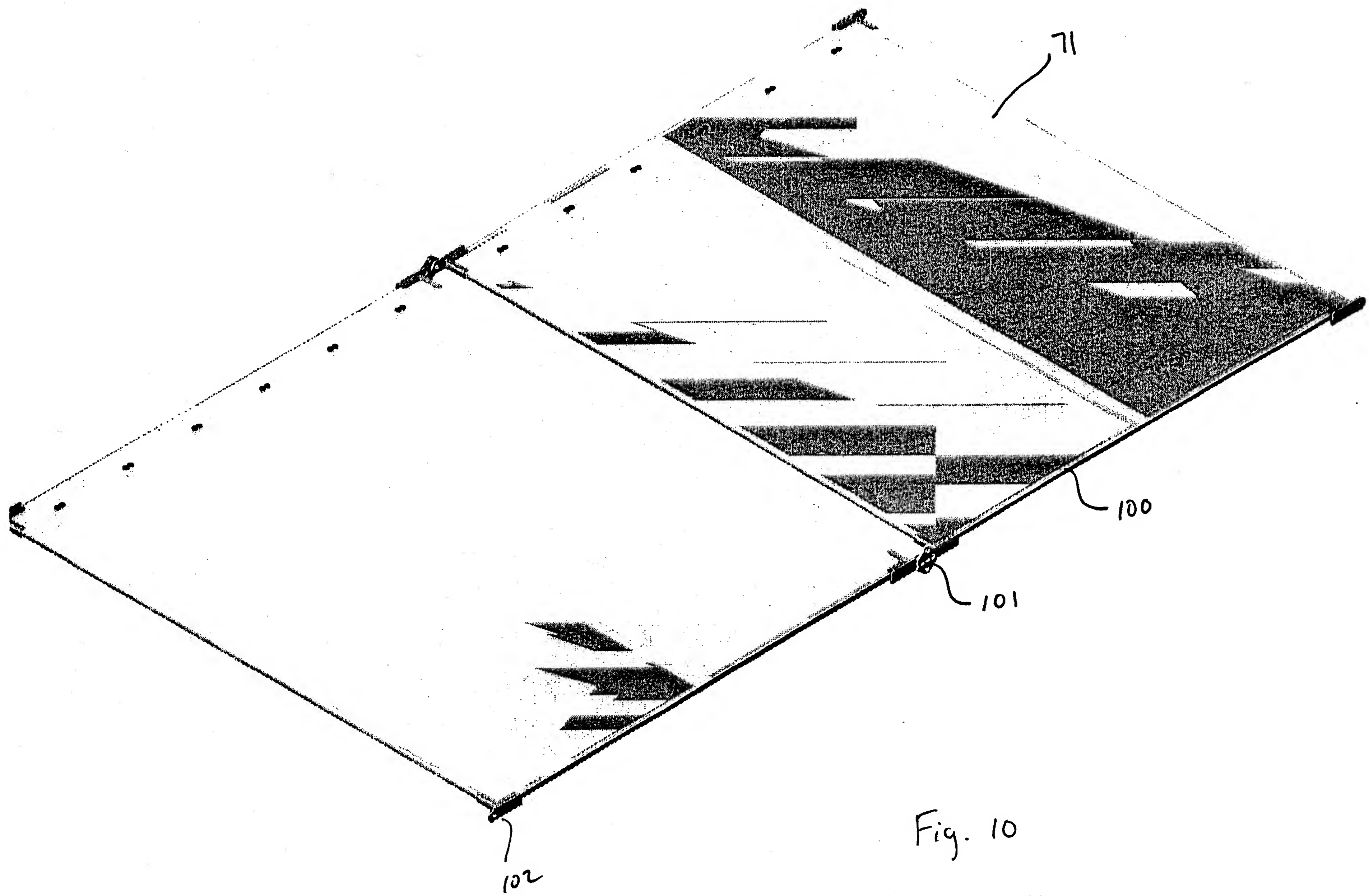


Fig. 10

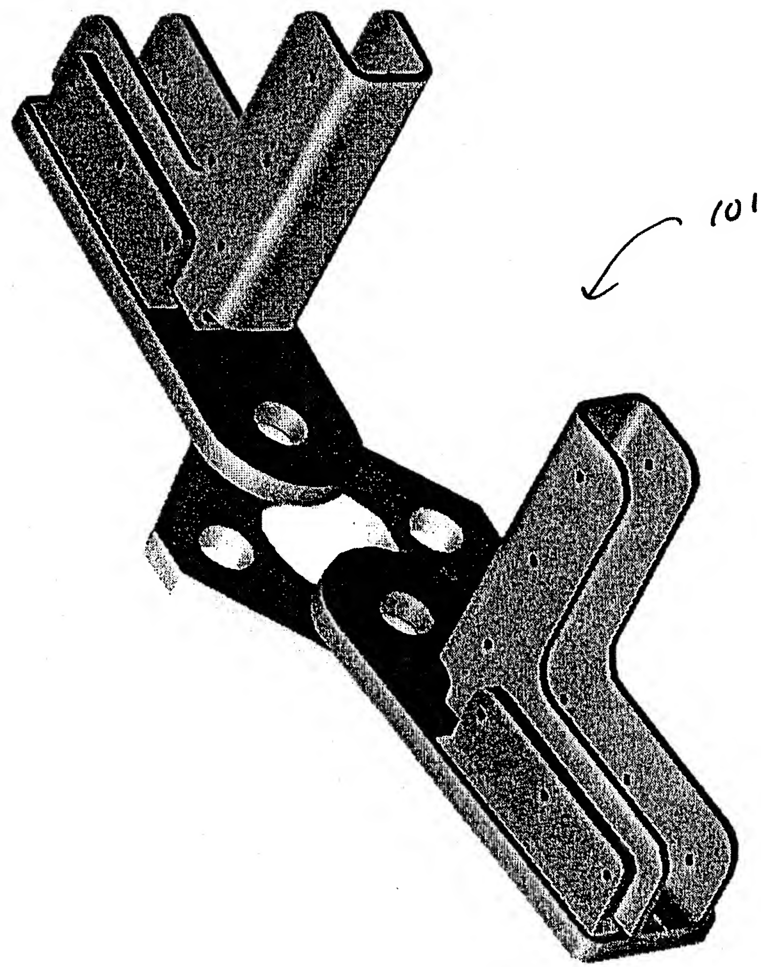


Fig. 11

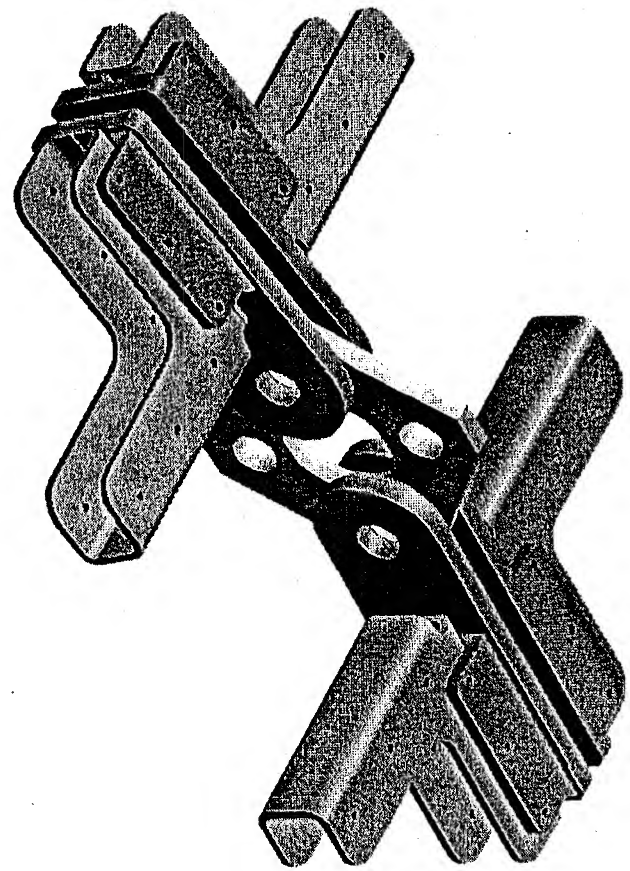
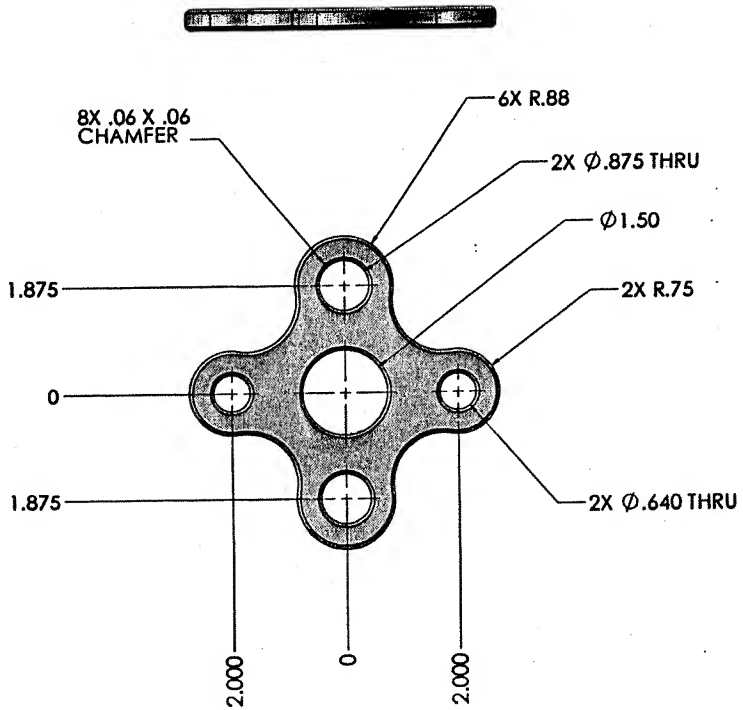
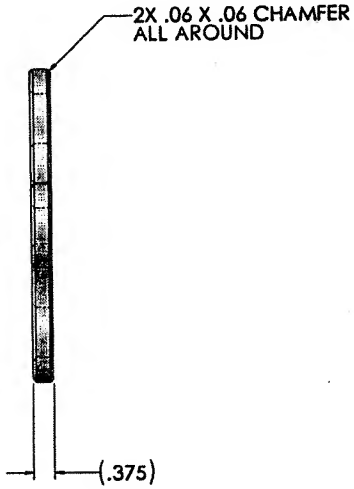
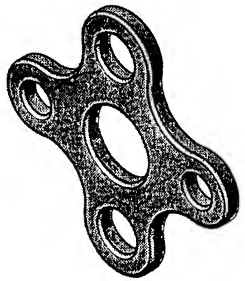


Fig. 12







NOTES:

1. MATERIAL: PLATE, 0.375" THICK, AL ALY, 6061-T651.
2. FINISH: GOLD IRIDITE IN ACCORDANCE WITH MIL-C-5541, CLASS 3.
3. BAG AND TAG WITH PART NUMBER.

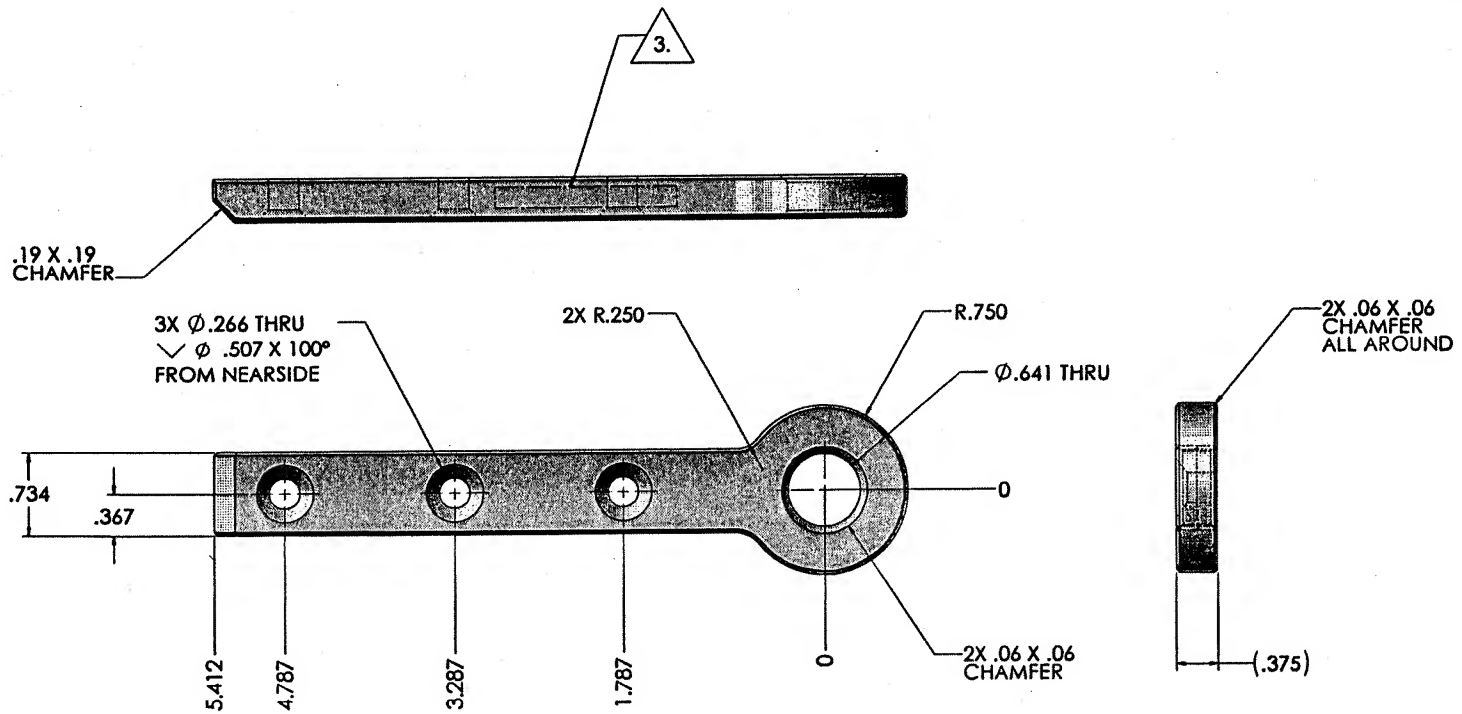
SkyBuilt Power, LLC

TITLE: LINK PLATE, POST GAP, 3-PV

SIZE D | DWG. NO. 3PV-0104 | REV 1

SCALE: 1:1 | WEIGHT: | SHEET 1 OF 1

Fig. 13



NOTES:

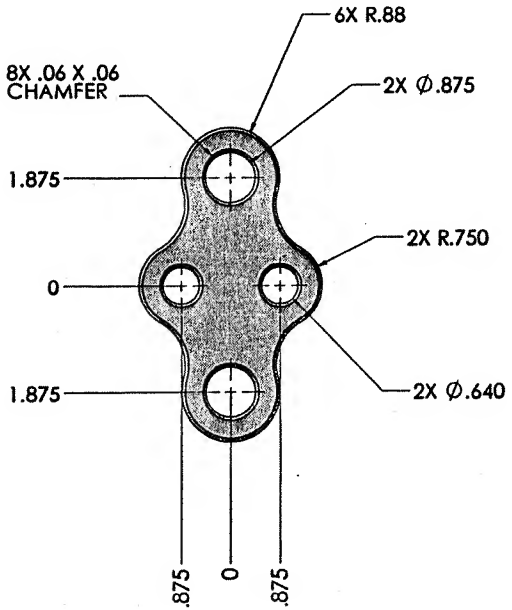
1. MATERIAL: PLATE, 0.375" THICK, AL ALY, 6061-T651.
2. FINISH: GOLD IRIDITE IN ACCORDANCE WITH MIL-C-5541, CLASS 3.
3. MARK WITH PART NUMBER AND REVISION LETTER PER MIL-STD-130 IN THE APPROXIMATE LOCATION SHOWN.

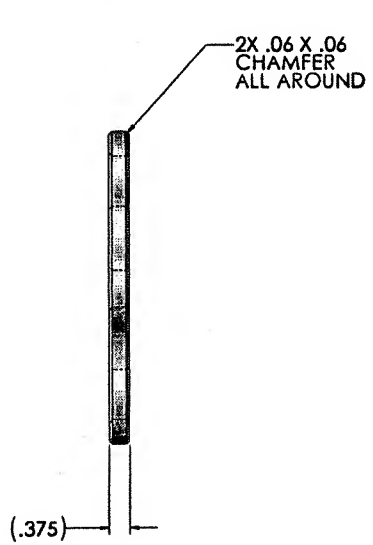
SkyBuilt Power, LLC

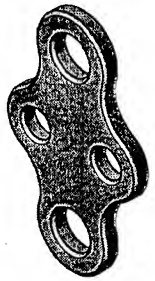
MOUNTING EAR, 3-PV PANEL

SIZE D | DWG. NO. 3PV-0101 | REV 1

Fig. 14







NOTES:

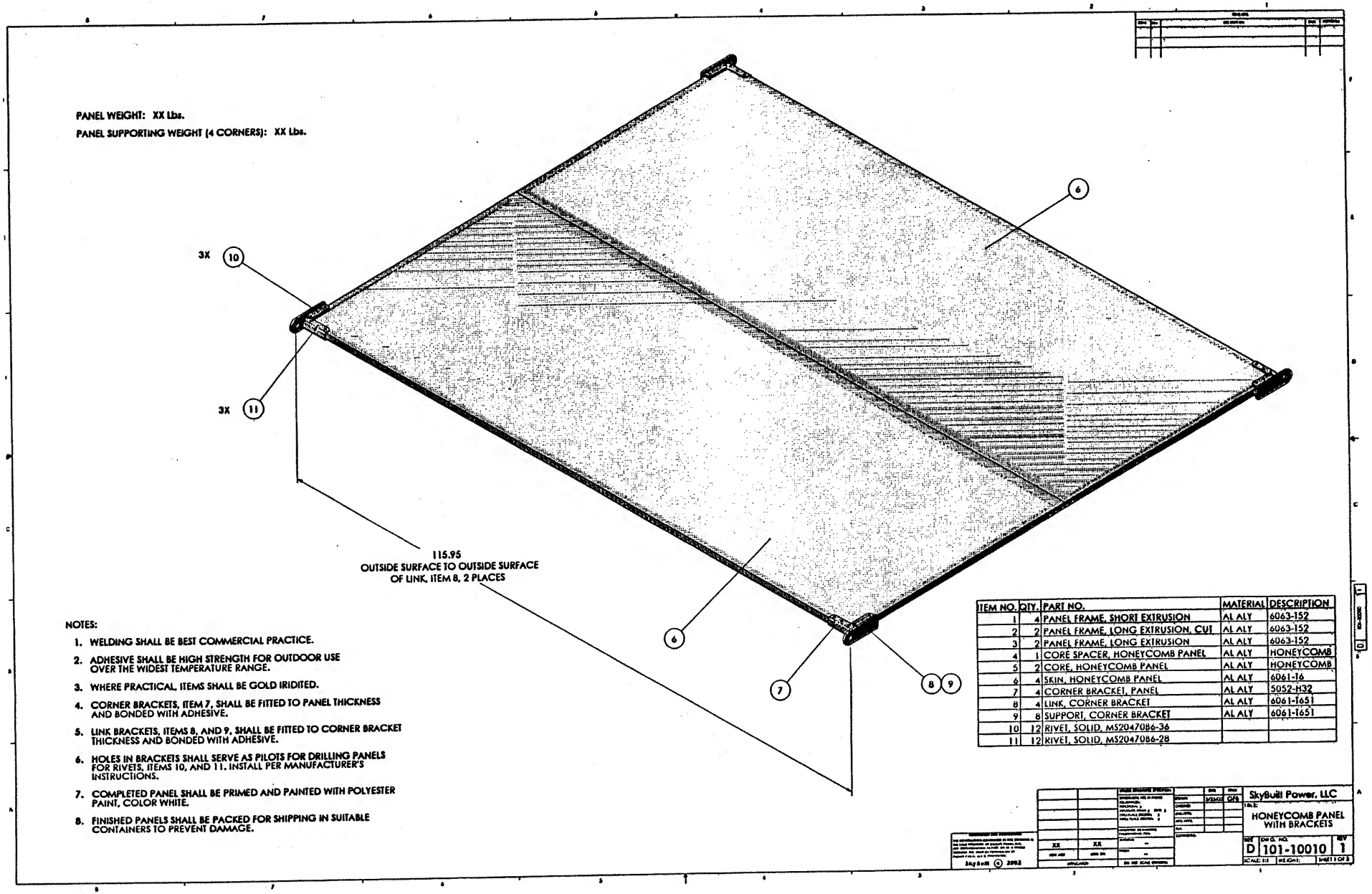
1. MATERIAL: PLATE, 0.375" THICK, AL ALY. 6061-T651.
2. FINISH: GOLD IRIDITE IN ACCORDANCE WITH MIL-C-5541, CLASS 3.
3. BAG AND TAG WITH PART NUMBER.

SkyBuilt Power, LLC

LINK PLATE, 3-PV

SIZE D | DWG. NO. 3PV-0103 | REV 1

Fig. 15



ITEM NO.	QTY.	PART NO.	MATERIAL	DESCRIPTION
1	4	PANEL FRAME, SHORT EXTRUSION	AL ALY	6063-152
2	2	PANEL FRAME, LONG EXTRUSION, CUT	AL ALY	6063-152
3	2	PANEL FRAME, LONG EXTRUSION	AL ALY	6063-152
4	1	CORE SPACER, HONEYCOMB PANEL	AL ALY	HONEYCOMB
5	2	CORE, HONEYCOMB PANEL	AL ALY	HONEYCOMB
6	4	SKIN, HONEYCOMB PANEL	AL ALY	6061-16
7	4	CORNER BRACKET, PANEL	AL ALY	5052-H32
8	4	LINK, CORNER BRACKET	AL ALY	6061-1651
9	8	SUPPORT, CORNER BRACKET	AL ALY	6061-1651
10	12	RIVET, SOLID, MS20470B6-36		
11	12	RIVET, SOLID, MS20470B6-28		

NOTES:

1. WELDING SHALL BE BEST COMMERCIAL PRACTICE.
2. ADHESIVE SHALL BE HIGH STRENGTH FOR OUTDOOR USE OVER THE WIDEST TEMPERATURE RANGE.
3. WHERE PRACTICAL, ITEMS SHALL BE GOLD IRIDITED.
4. CORNER BRACKETS, ITEM 7, SHALL BE FITTED TO PANEL THICKNESS AND BONDED WITH ADHESIVE.
5. LINK BRACKETS, ITEMS 8, AND 9, SHALL BE FITTED TO CORNER BRACKET THICKNESS AND BONDED WITH ADHESIVE.
6. HOLES IN BRACKETS SHALL SERVE AS PILOTS FOR DRILLING PANELS FOR RIVETS, ITEMS 10, AND 11. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
7. COMPLETED PANEL SHALL BE PRIMED AND PAINTED WITH POLYESTER PAINT, COLOR WHITE.
8. FINISHED PANELS SHALL BE PACKED FOR SHIPPING IN SUITABLE CONTAINERS TO PREVENT DAMAGE.

SkyBuilt Power, LLC

HONEYCOMB PANEL WITH BRACKETS

D 101-10010 1

Fig. 16

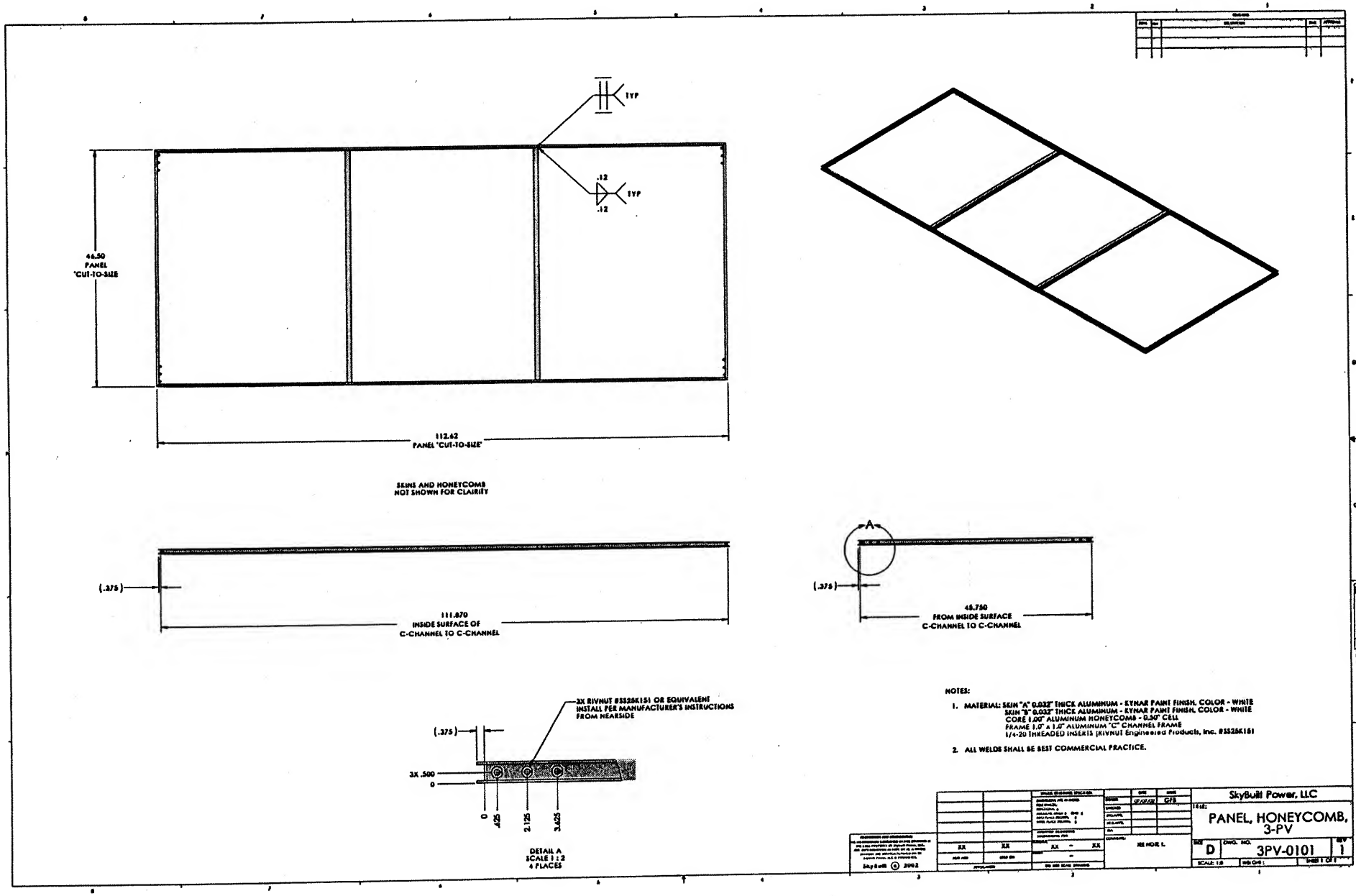

TYP
.12
TYP
.12
46.50
PANEL
'CUT-TO-SIZE
112.62
PANEL 'CUT-TO-SIZE'
SKINS AND HONEYCOMB
NOT SHOWN FOR CLARITY
(.375)
111.870
INSIDE SURFACE OF
C-CHANNEL TO C-CHANNEL
A
(.375)
48.750
FROM INSIDE SURFACE
C-CHANNEL TO C-CHANNEL
3X RIVNUT #3525K151 OR EQUIVALENT
INSTALL PER MANUFACTURER'S INSTRUCTIONS
FROM NEARSIDE
(.375)
3X .500
0
0
.425
2.125
3.425
DETAIL A
SCALE 1 : 2
4 PLACES
NOTES:
1. MATERIAL: SKIN "A" 0.032" THICK ALUMINUM - KYNAR PAINT FINISH, COLOR - WHITE
SKIN "B" 0.032" THICK ALUMINUM - KYNAR PAINT FINISH, COLOR - WHITE
CORE 1.00" ALUMINUM HONEYCOMB - 0.50" CELL
FRAME 1.0" x 1.0" ALUMINUM "C" CHANNEL FRAME
1/4-20 THREADED INSERTS (RIVNUT Engineered Products, Inc. #3525K151
2. ALL WELDS SHALL BE BEST COMMERCIAL PRACTICE.
SkyBuilt Power, LLC
TITLE:
PANEL, HONEYCOMB,
3-PV
SIZE
D
DWG. NO.
3PV-0101
REV
1
SCALE: 1:5
SHEET 1 OF 1

Fig. 17

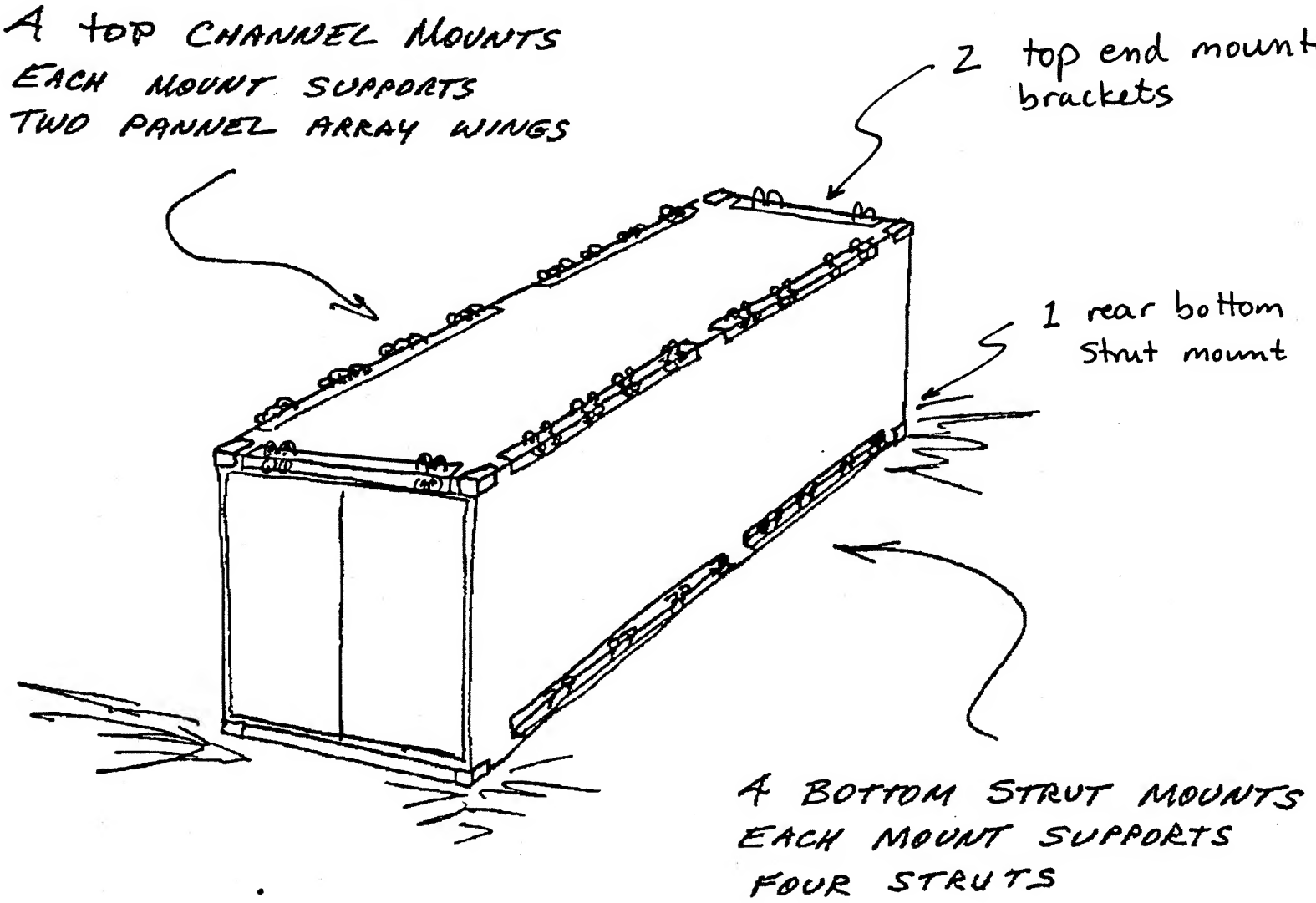


Fig. 18

David J. Muchow
703-536-7125

08/10/02 08:04A P.008

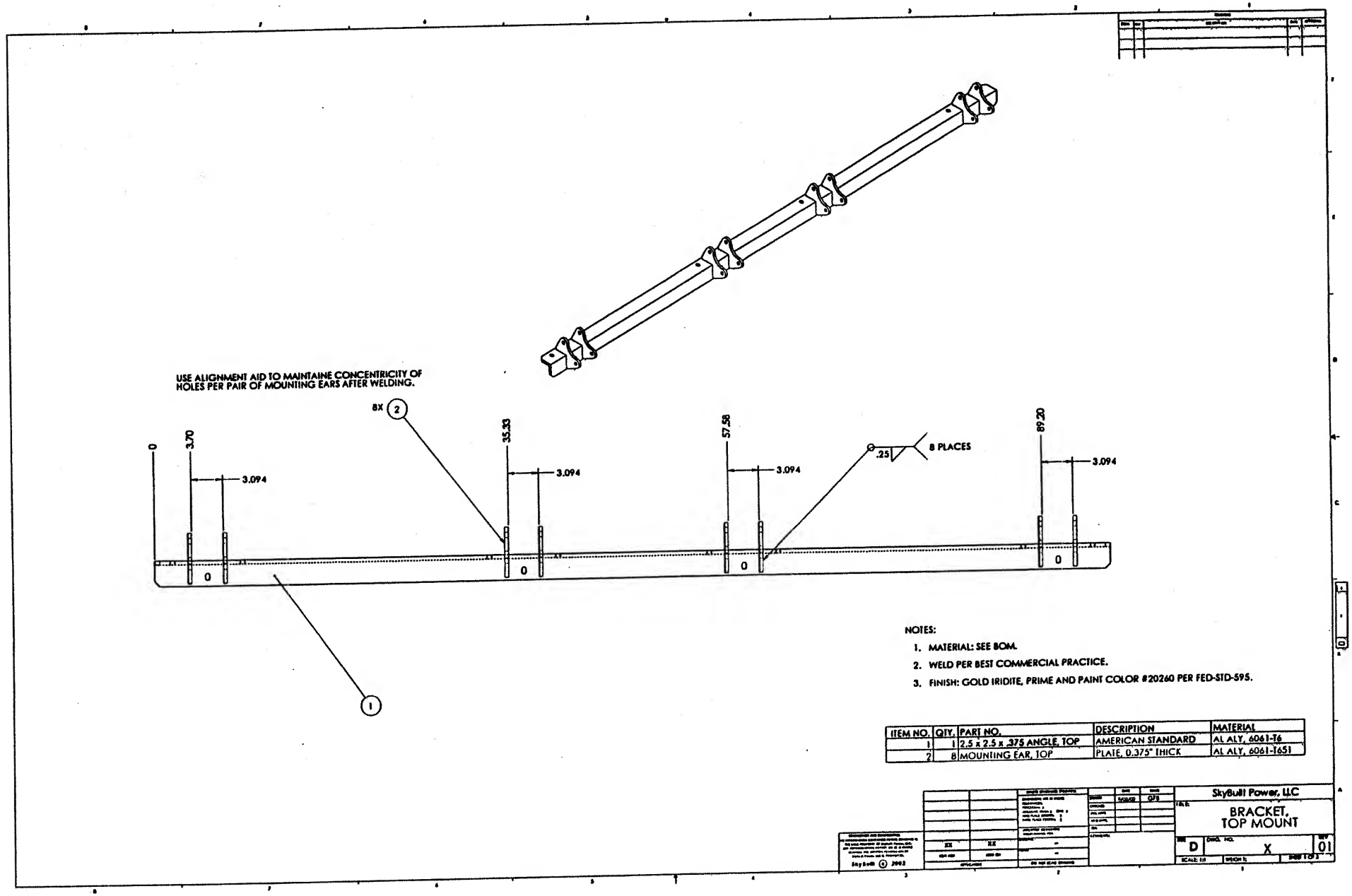
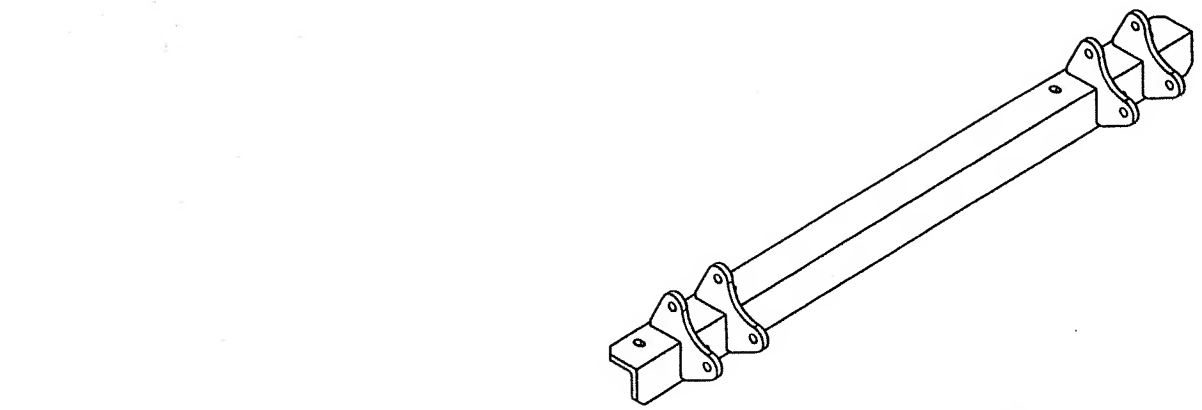
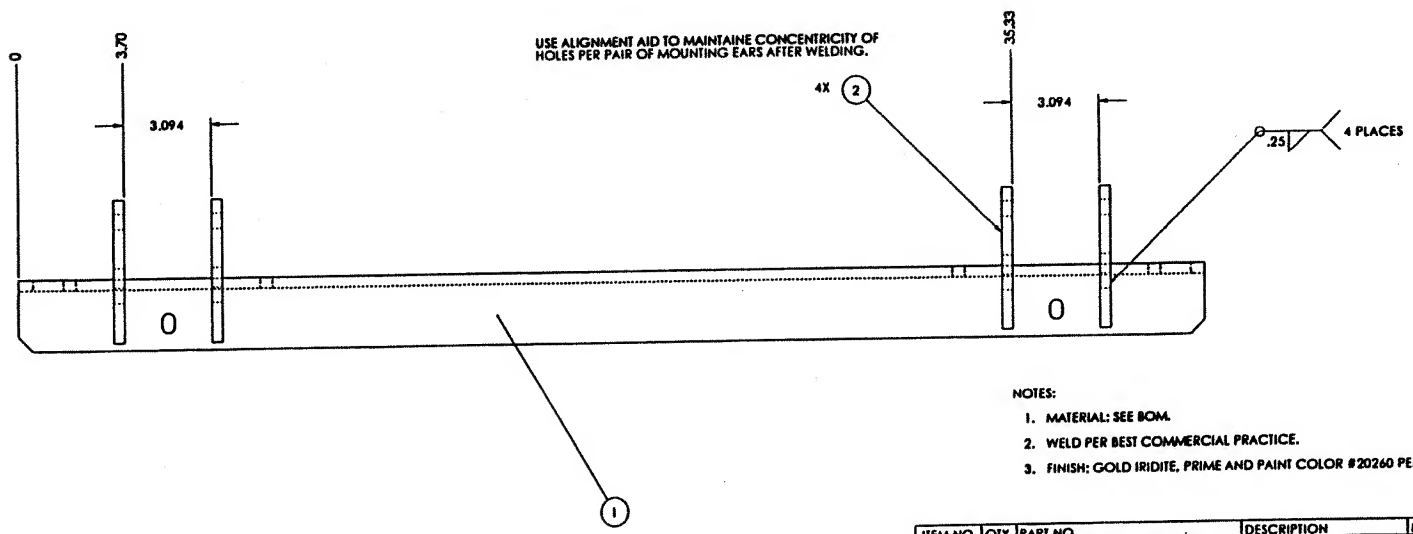

USE ALIGNMENT AID TO MAINTAINE CONCENTRICITY OF HOLES PER PAIR OF MOUNTING EARS AFTER WELDING.
8X (2)
0
3.70
3.094
35.33
3.094
57.58
3.094
.25
8 PLACES
89.20
3.094
(1)
NOTES:
1. MATERIAL: SEE BOM.
2. WELD PER BEST COMMERCIAL PRACTICE.
3. FINISH: GOLD IRIDITE, PRIME AND PAINT COLOR #20260 PER FED-STD-595.
ITEM NO. | QTY. | PART NO. | DESCRIPTION | MATERIAL
1 | 1 | 2.5 x 2.5 x .375 ANGLE, TOP | AMERICAN STANDARD | AL ALY, 6061-T6
2 | 8 | MOUNTING EAR, TOP | PLATE, 0.375" THICK | AL ALY, 6061-T651
SkyBuild Power, LLC
BRACKET, TOP MOUNT
SIZE D
DWG. NO. X
REV 01

Fig. 19





NOTES:

1. MATERIAL: SEE BOM.
2. WELD PER BEST COMMERCIAL PRACTICE.
3. FINISH: GOLD IRIDITE, PRIME AND PAINT COLOR #20260 PER FED-STD-595.

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
1	1	2.5 x 2.5 x .375 ANGLE, TOP END	AMERICAN STANDARD	AL ALY, 6061-T6
2	4	MOUNTING EAR, TOP	PLATE, 0.375" THICK	AL ALY, 6061-T651

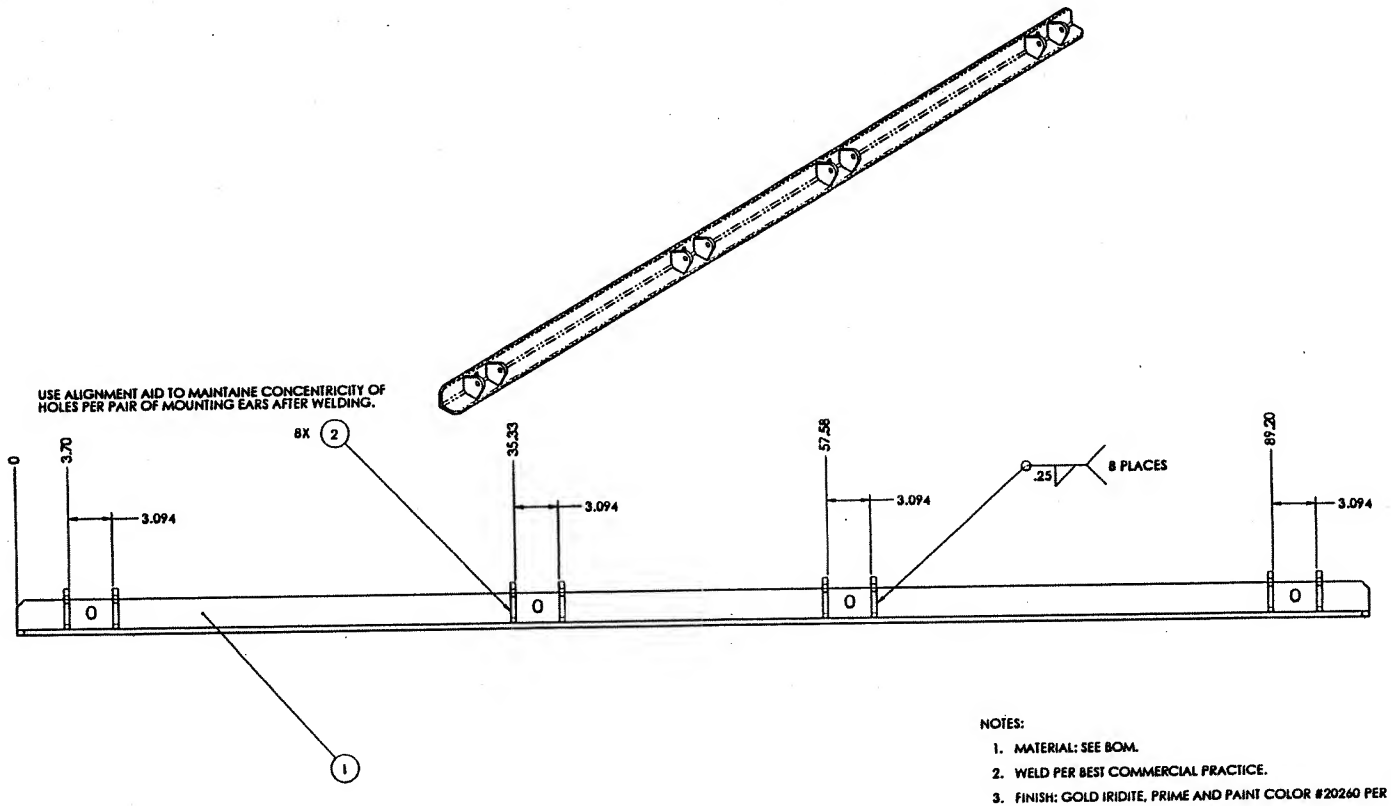
SkyBuilt Power, LLC

BRACKET, TOP END MOUNT

SIZE D | DWG. NO. X | REV 01

SCALE: 1:2 | WEIGHT: | SHEET 1 OF 2

Fig. 20



NOTES:

1. MATERIAL: SEE BOM.
2. WELD PER BEST COMMERCIAL PRACTICE.
3. FINISH: GOLD IRIDITE, PRIME AND PAINT COLOR #20260 PER FED-STD-595.

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
1	1	2.5 x 2.5 x .375 ANGLE, BOTTOM	AMERICAN STANDARD	AL ALY, 6061-T6
2	8	MOUNTING EAR, BOTTOM	PLATE, 0.375" THICK	AL ALY, 6061-T651

SkyBuilt Power, LLC

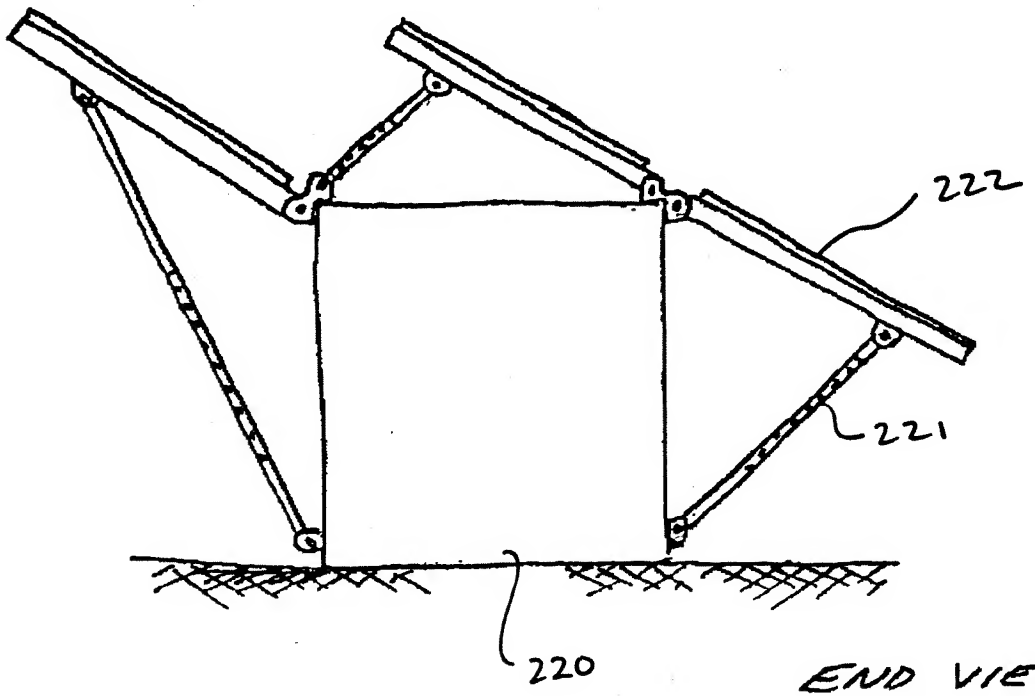
TITLE: BRACKET, BOTTOM MOUNT

SIZE: D | DWG. NO.: X | REV: 01

SCALE: 1:1 | WEIGHT: | SHEET 1 OF 3

Fig. 21

David J. Muchow
703-536-7125



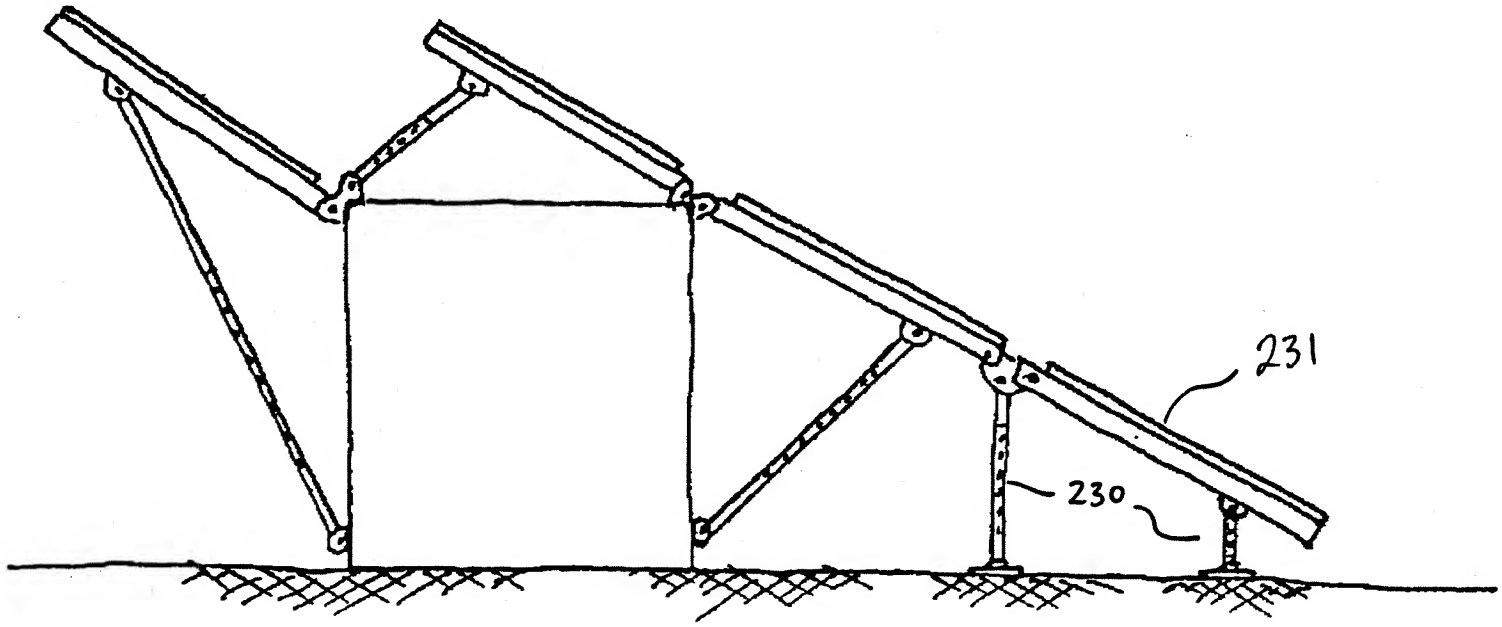
END VIEW OF CONTAINER, PANELS DEPLOYED

Fig. 22

8/15/02

DJM

David J. Muchow 703-536-7125



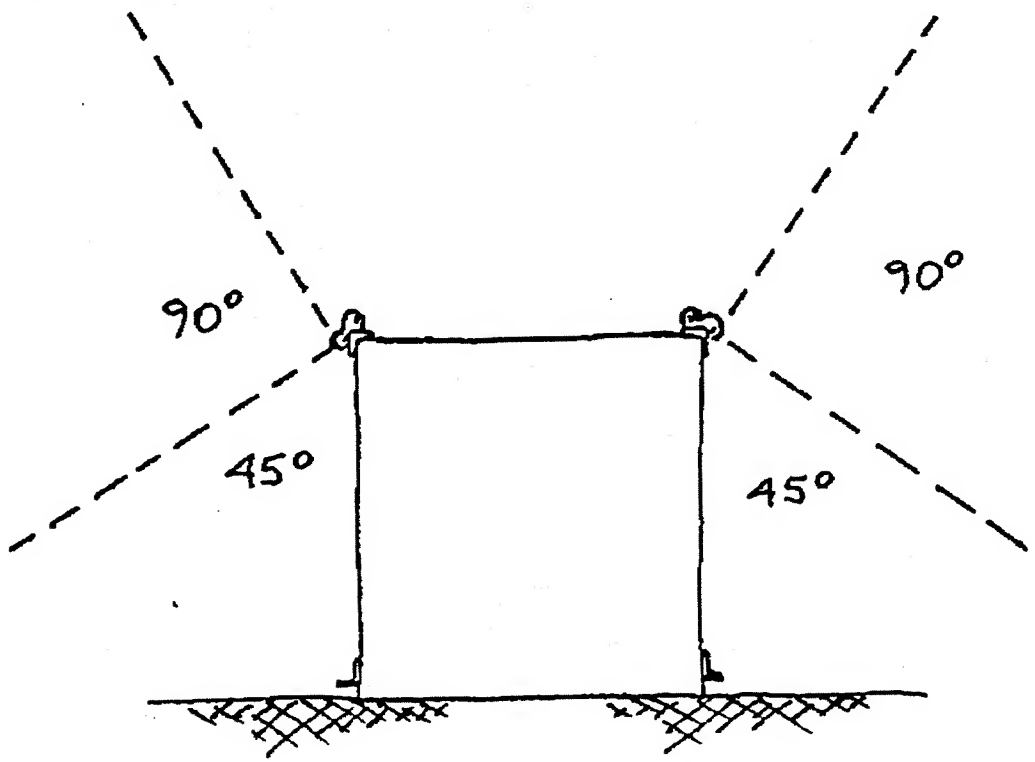
END VIEW OF CONTAINER WITH EXTENSION PANELS

Fig. 23

8/15/02

(3)

David J. Muchow
703-536-7125



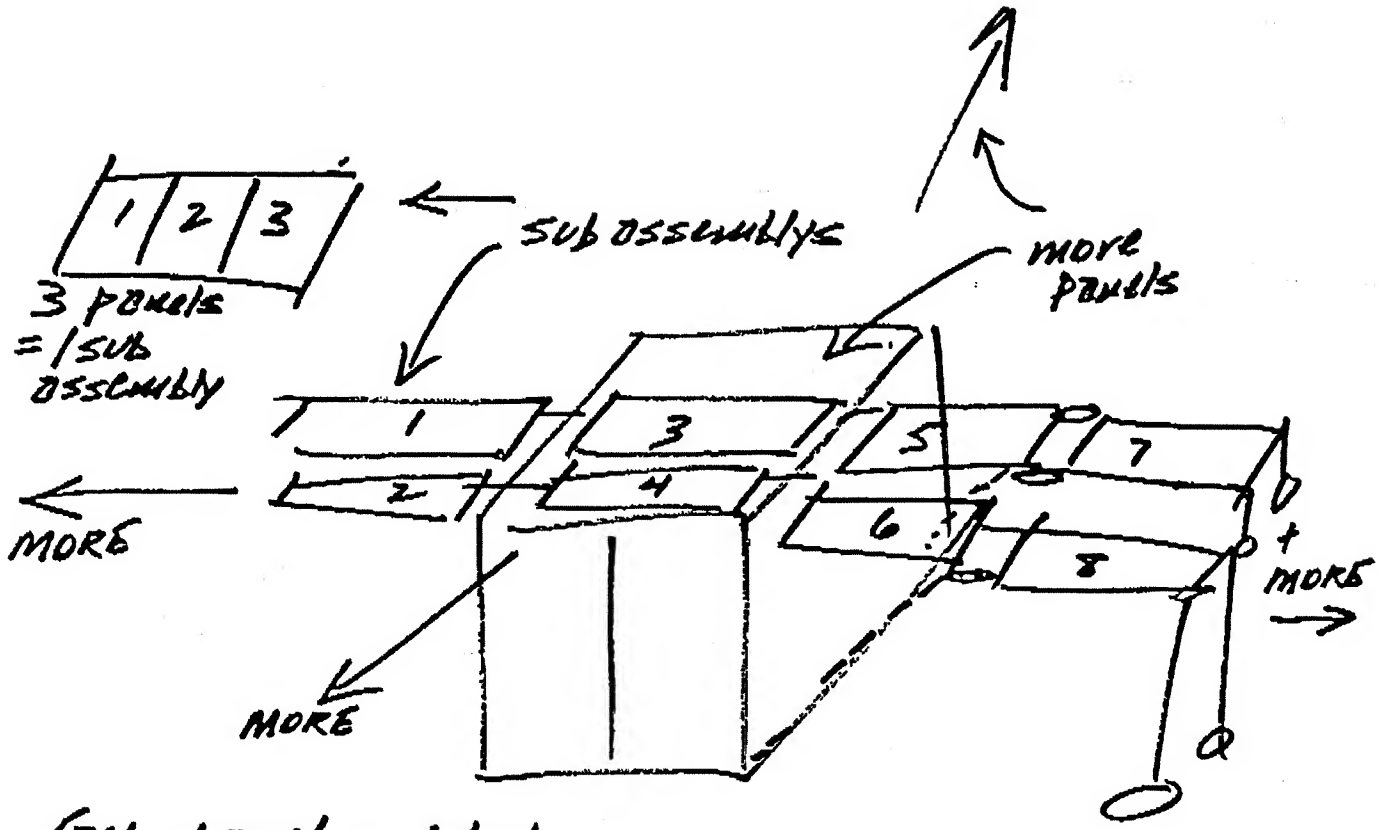
ANGLE ADJUSTMENT RANGE

END VIEW OF CONTAINER EITHER SIDE CAN BE HIGH OR LOW

Fig. 24

(2)

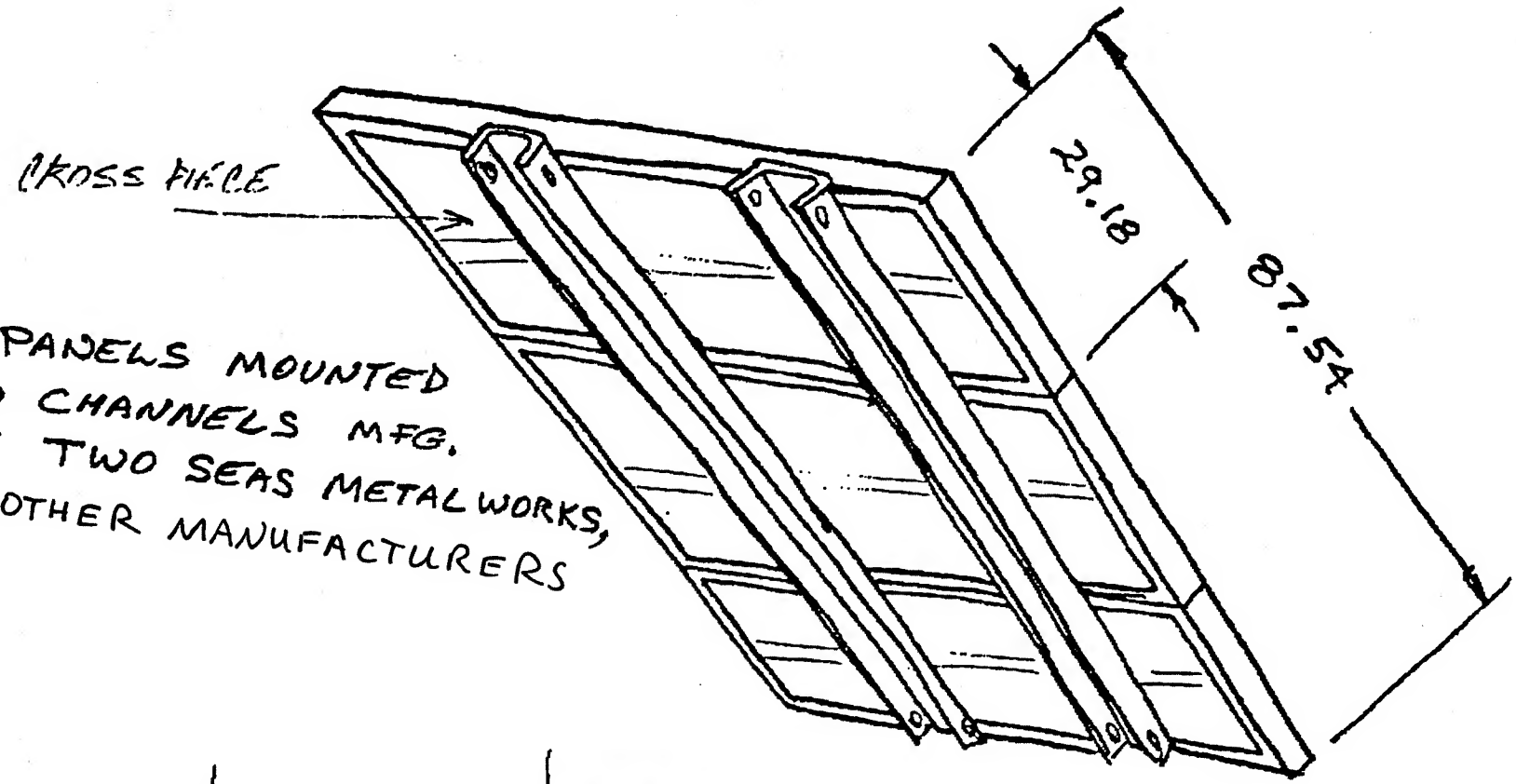
Fig. 25



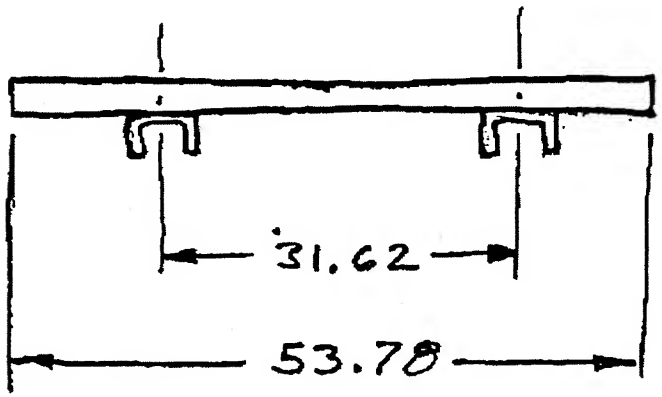
Each panel = 64W
Ea Sub Ass. = 192W
8 Sub Ass. = 1,536W for prototype
x 2 (full build out) = 3072W
+ front & back
+ just add more panels

3072W x 4.5 hrs. of sun/day ÷ 24 hrs = 576W
Continuous — can boost 1/3 w/ different inverter, or more efficient panels, or add more panels

David J. Muchow
703-536-7125



3 PANELS MOUNTED TO CHANNELS MFG. BY TWO SEAS METAL WORKS, OR OTHER MANUFACTURERS



UNI-SOLAR US-64, OR OTHER SOLAR PANEL

PANEL ASS'Y UNDERSIDE

Fig. 26

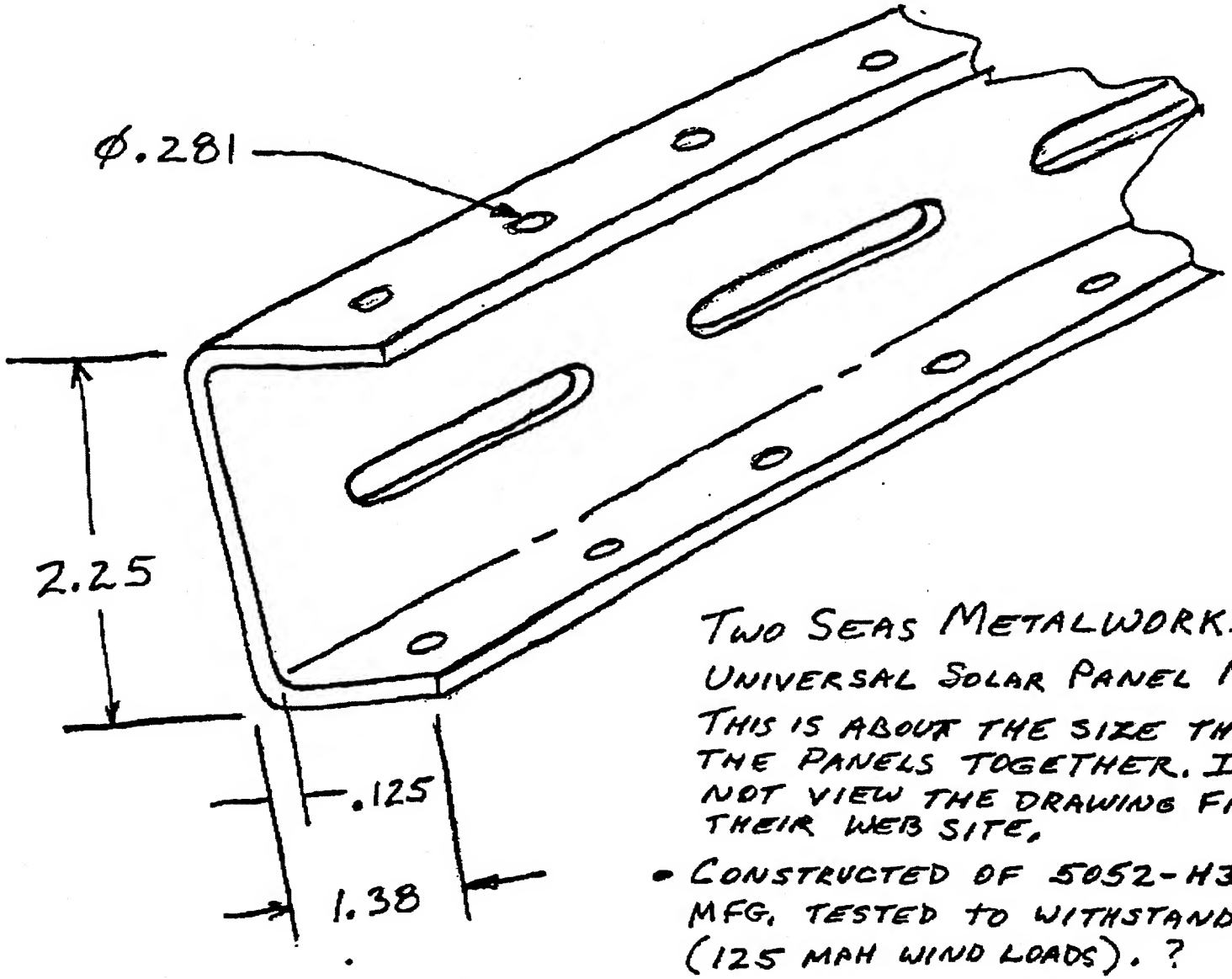


Fig. 27

TWO SEAS METALWORKS

UNIVERSAL SOLAR PANEL MOUNTS

THIS IS ABOUT THE SIZE THAT MOUNTS THE PANELS TOGETHER. I COULD NOT VIEW THE DRAWING FILES FROM THEIR WEB SITE.

- CONSTRUCTED OF 5052-H32 ALUMINUM MFG. TESTED TO WITHSTAND 50 PSF (125 MPH WIND LOADS). ?
- PUNCH / FORMED CONSTRUCTION
- THEY MAKE MANY SIZES OF CHANNELS AND BRACKETS.

(6)

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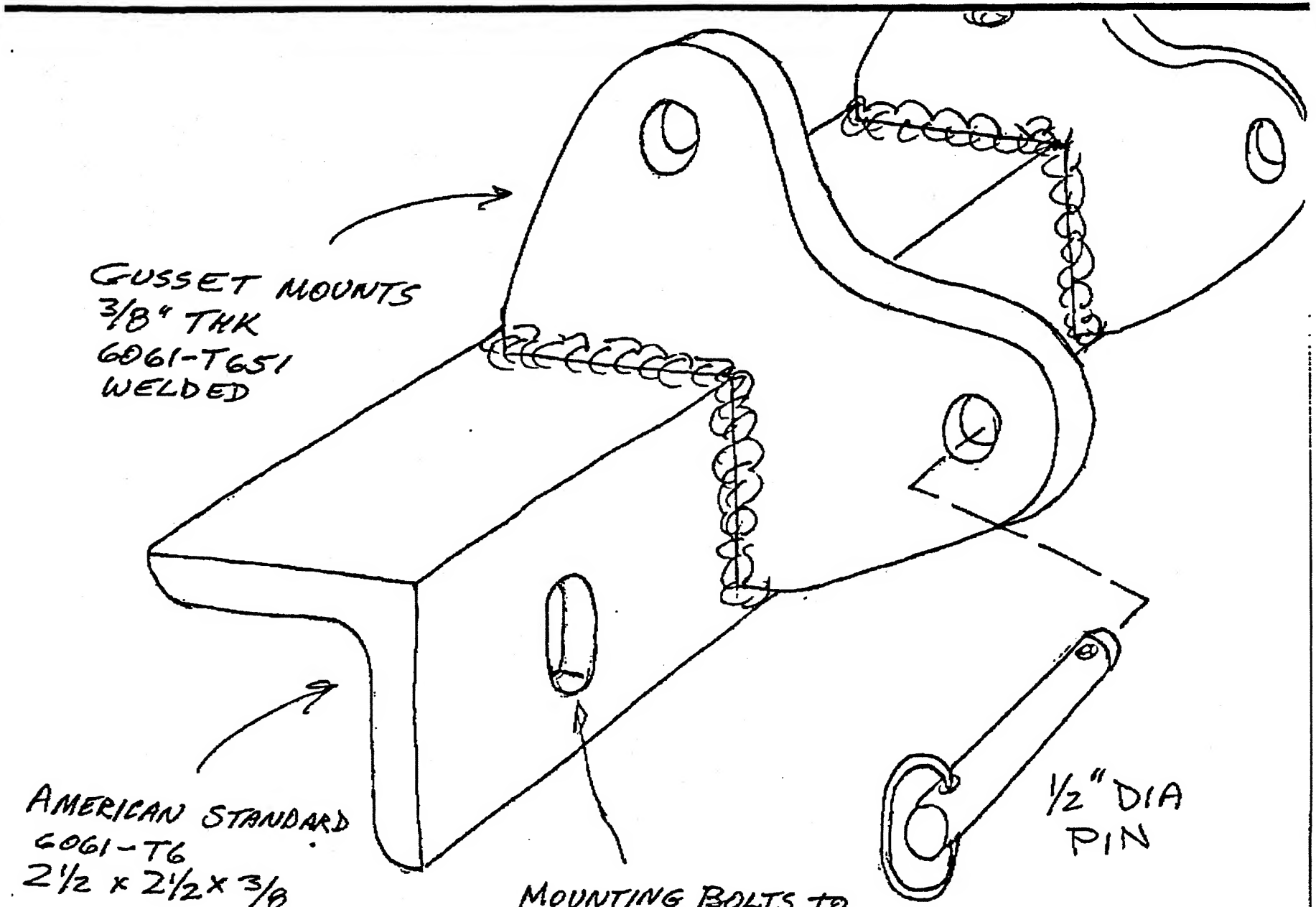
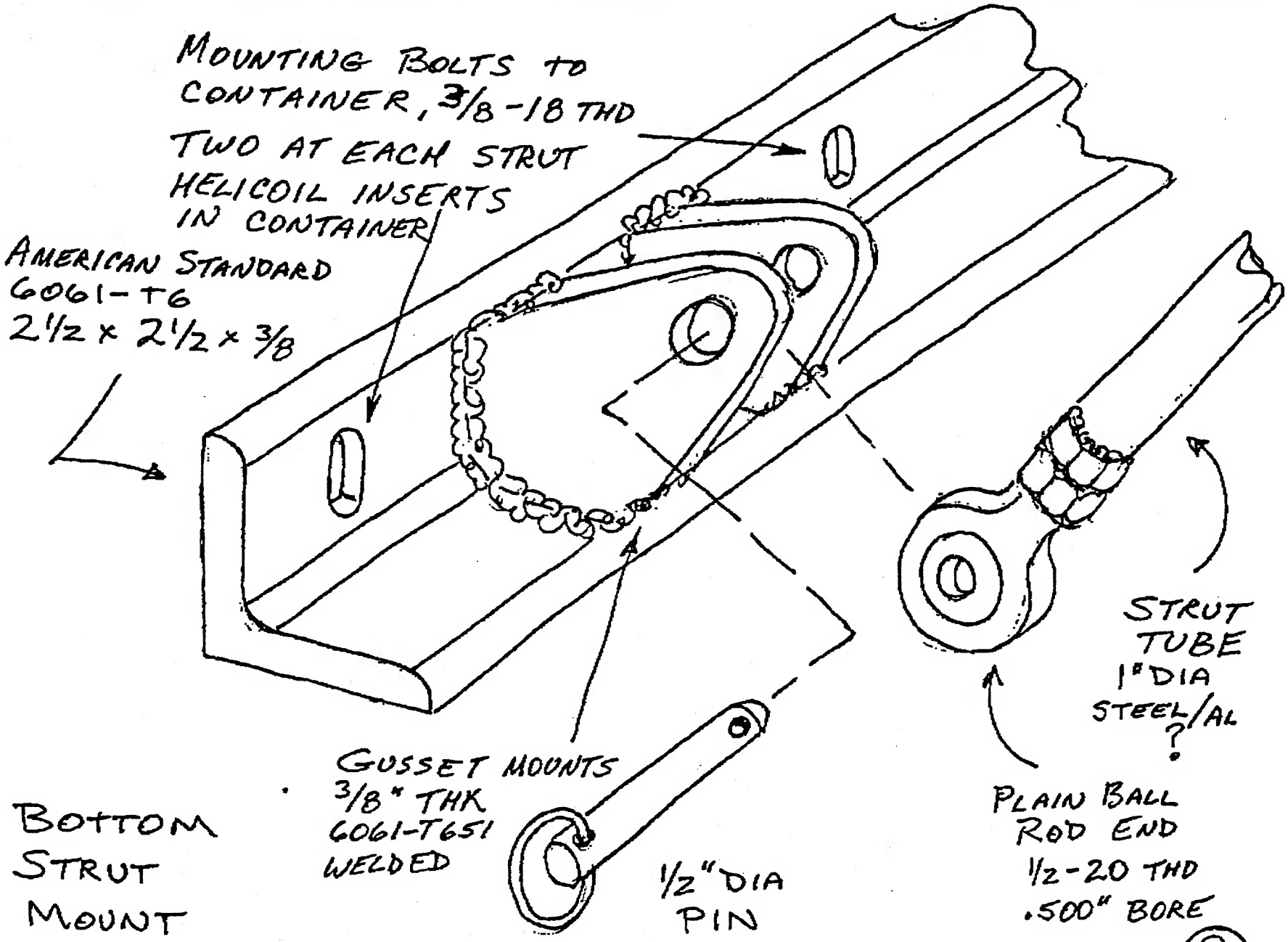


TOP CHANNEL MOUNT

Fig. 28



BOTTOM STRUT MOUNT

9

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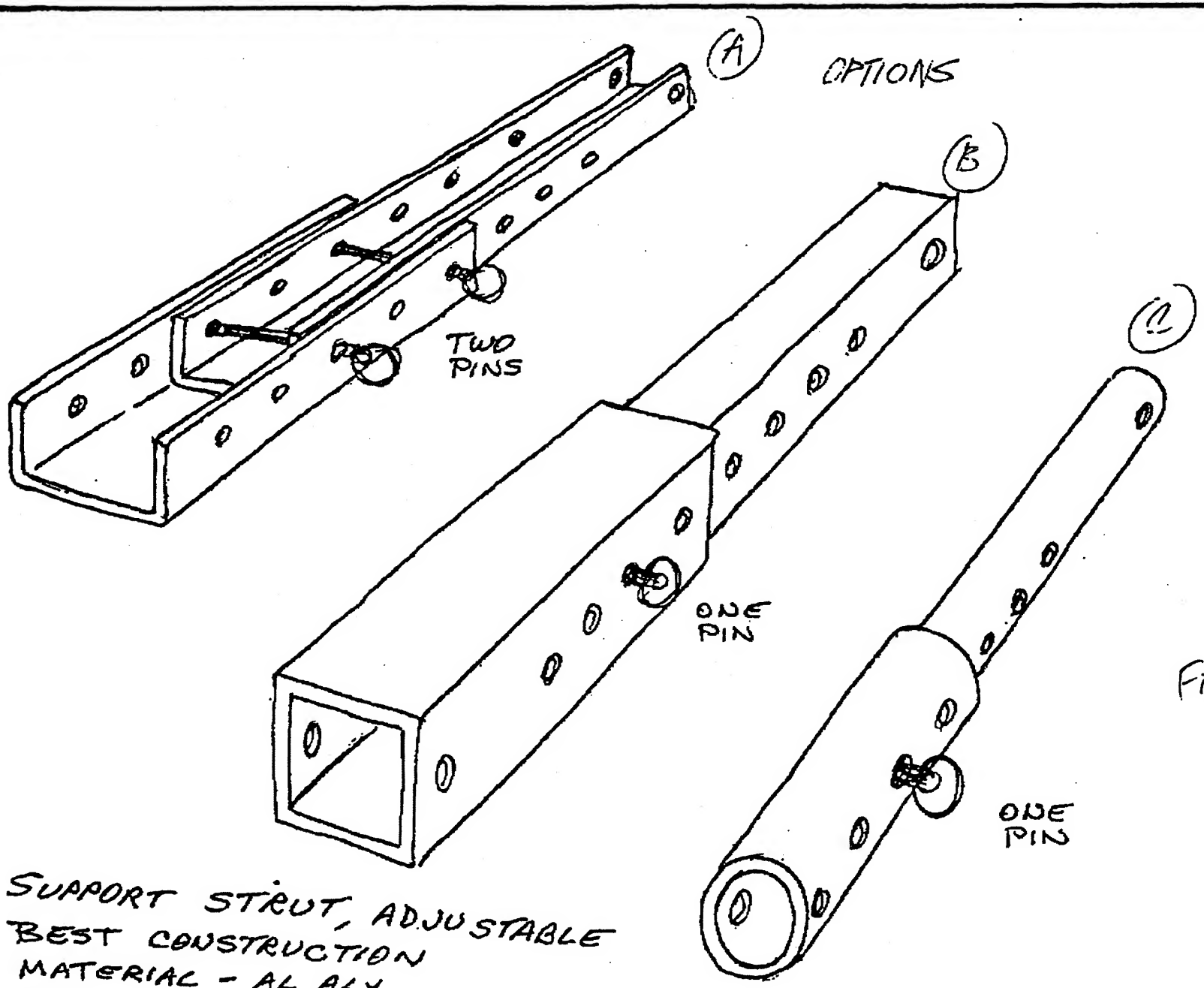

Fig. 30

SUPPORT STRUT, ADJUSTABLE
BEST CONSTRUCTION
MATERIAL - AL ALY
THICKNESS - ? DETERMINE FROM LOAD DATA
PIN, STEEL, ? DIA. DETERMINE FROM SHEAR LOAD DATA

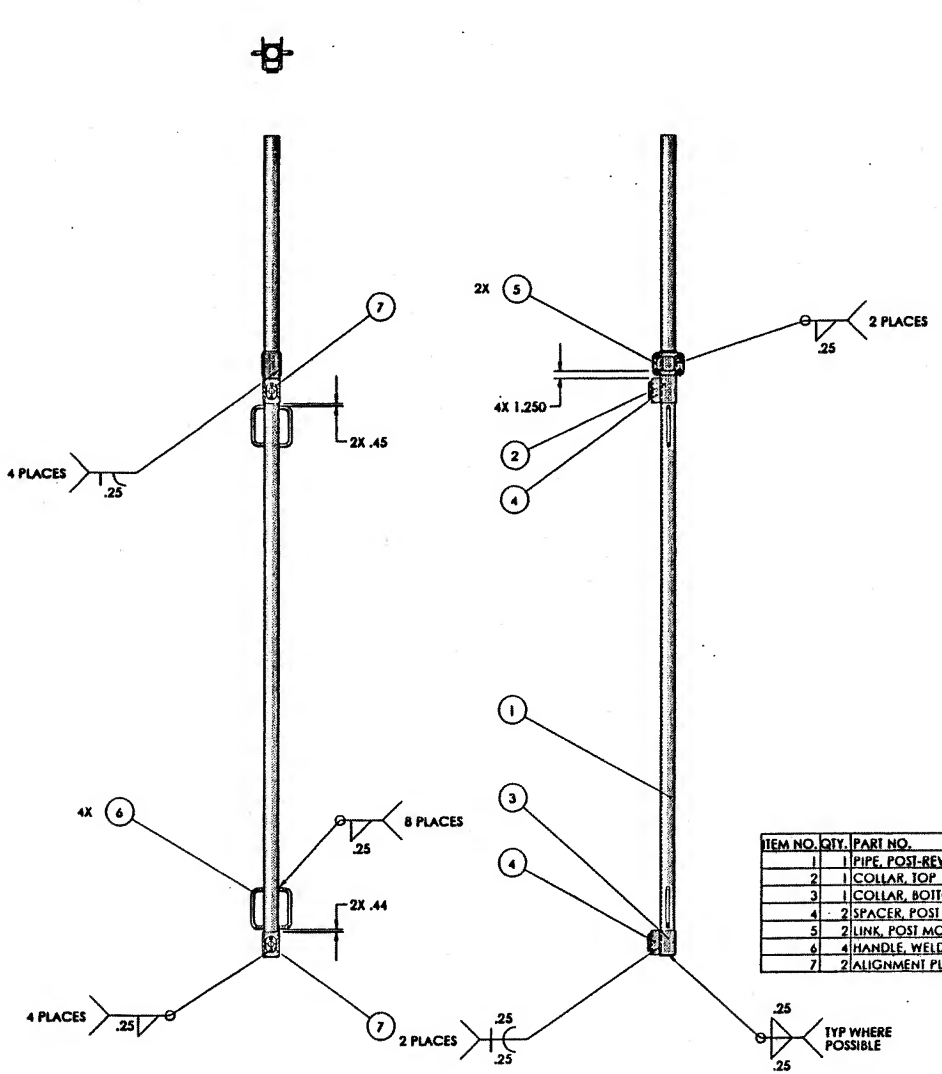

Fig.31

NOTES:

1. MATERIAL: SEE BOM.
2. WELDING SHALL BE BEST COMMERCIAL PRACTICE.
3. FINISH: PRIME AND PAINT WITH...
4. MARK PART NUMBER...

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	1	PIPE, POST-REV 02	TUBING, ROUND, 2-5/8" DIA x 3/16" WALL	CARBON STEEL	D.O.M.
2	1	COLLAR, TOP	SQUARE STRUCTURAL TUBING, 3 X 3/16	CARBON STEEL	ASTM A513
3	1	COLLAR, BOTTOM	SQUARE STRUCTURAL TUBING, 3 X 3/16	CARBON STEEL	ASTM A513
4	2	SPACER, POST COLLAR	C CHANNEL, C 3 X 5.0	STRUCTURAL STEEL	ASTM A36
5	2	LINK, POST MOUNT	PLATE, 0.250" THICK	HOT ROLLED STEEL	LOW CARBON
6	4	HANDLE, WELDED, POST	ROD, 5/8" DIA	STEEL, LOW CARBON	1018
7	2	ALIGNMENT PLATE, POST	PLATE, 1/2" THICK	HOT ROLLED STEEL	LOW CARBON

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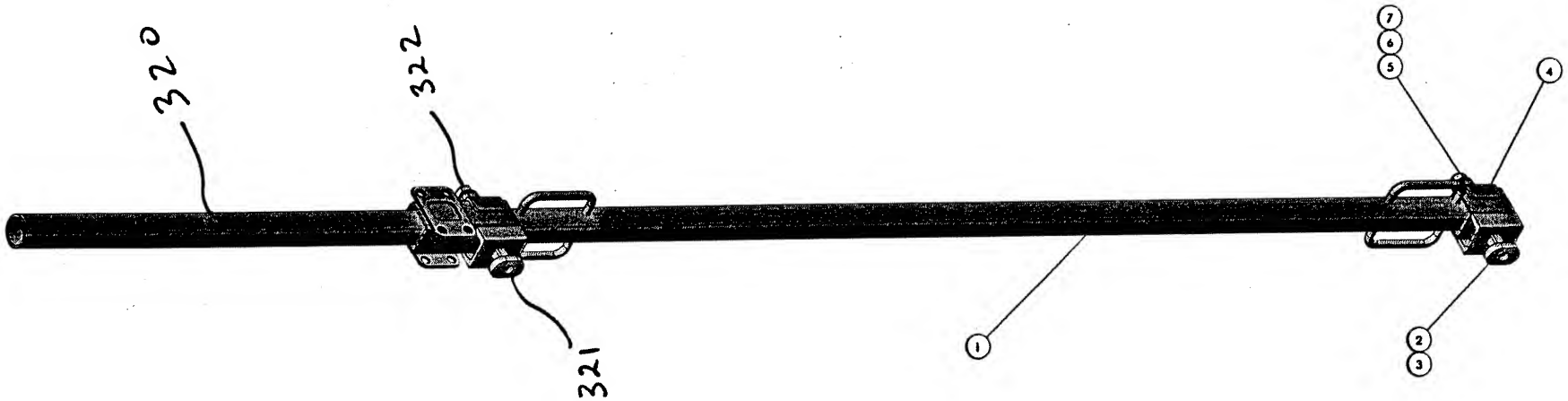
TITLE: POST, WELDMENT ASSEMBLY

SIZE D | DWG. NO. 3PV-0102 | REV 2

SCALE: 1:10 | WEIGHT: | SHEET 1 OF 6



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
1	1	POST WELDMENT ASSEMBLY-REV 02		
2	2	LOCKING CAM		
3	2	ROTOR CLIP, #C-100		
4	2	STOP BRACKET		
5	2	FW 0.812	FLAT WASHER, .812 ID x 1.75 OD x .148 THK	
6	2	LW 0.75	LOCK WASHER, 3/4"	
7	2	HHBOLT 0.7500-16x1.25x1.25-N	BOLT, HEX HEAD, 3/4-16 X 1.25 LONG	

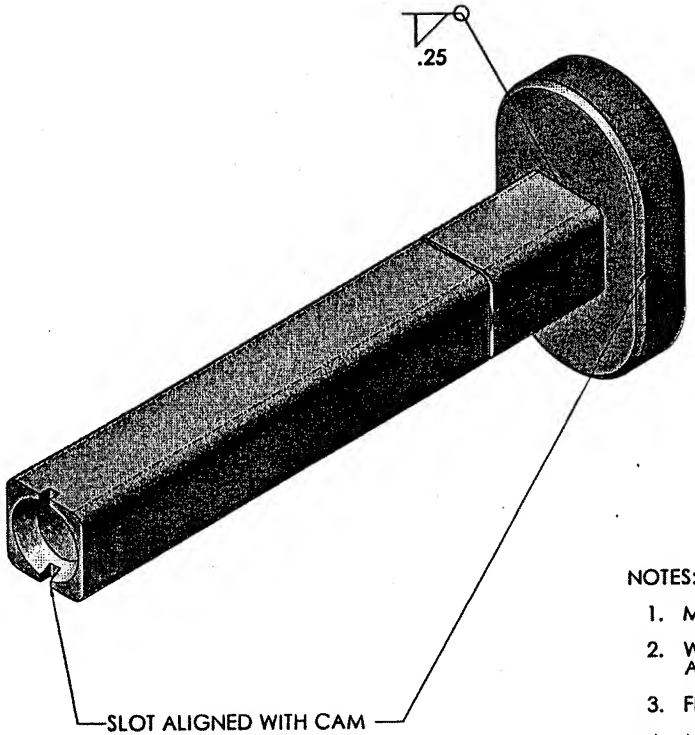
Fig. 32

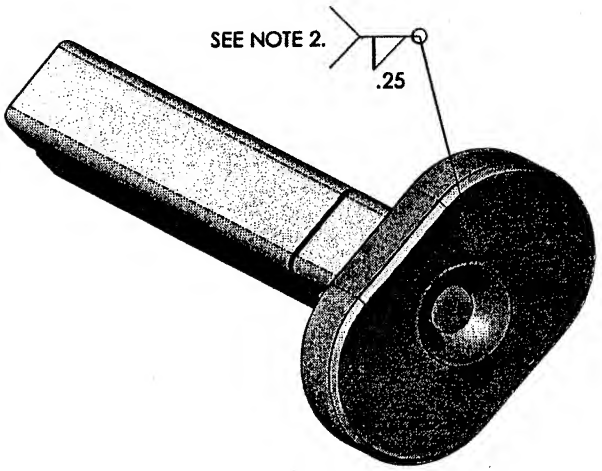
SkyBuilt Power, LLC

CORNER POST ASSEMBLY

SIZE D | DWG. NO. 3PV-0105 | REV 2

SCALE: 1:2 | SHEET 1 OF 1





NOTES:

1. MATERIAL: SEE BOM.
2. WELDING SHALL BE BEST COMMERCIAL PRACTICE. ALIGN SLOTS IN POST WITH LONG SIDE OF CAM.
3. FINISH: PRIME AND PAINT WITH...
4. MARK PART NUMBER...

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
1	1	POST, LOCKING PLATE	HOT ROLLED SQUARE, 1.00" x 1.00"	LOW CARBON STEEL
2	1	CAM, LOCKING PLATE	PLATE, 5/8" THICK	HOT ROLLED STEEL

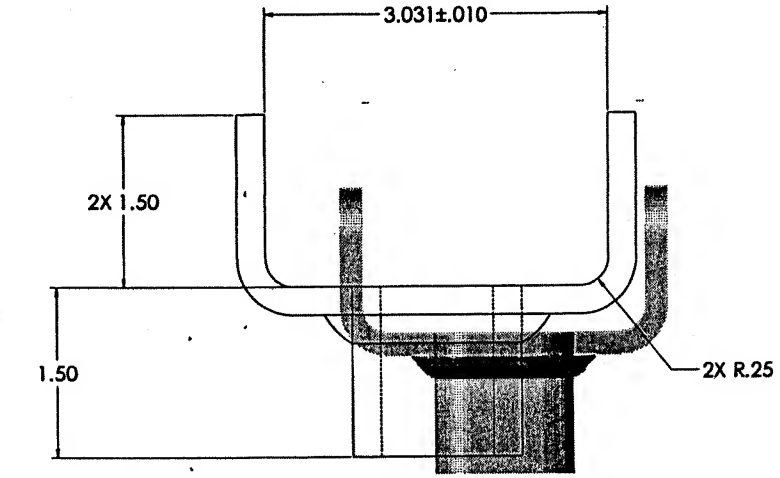
Fig. 33

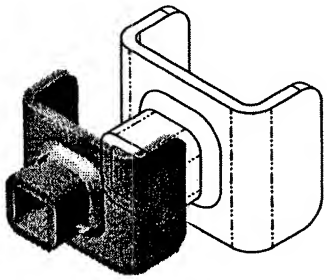
SkyBuilt Power, LLC

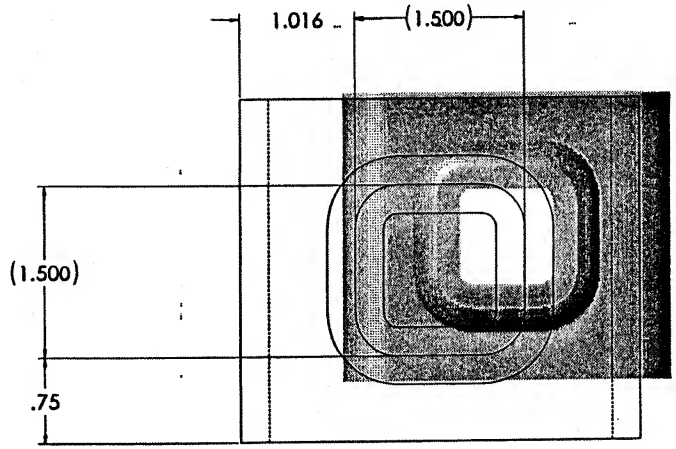
LOCKING CAM, 3-PV

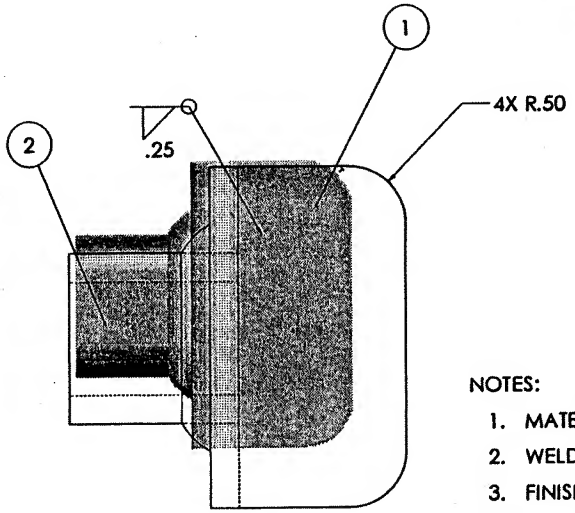
SIZE D | DWG. NO. 3PV-01017 | REV 1

SCALE: 1:1 | WEIGHT: | SHEET 1 OF 1









NOTES:

1. MATERIAL: SEE BOM.
2. WELDING SHALL BE BEST COMMERCIAL PRACTICE.
3. FINISH: PRIME AND PAINT WITH...
4. MARK PART NUMBER...

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
1	1	STOP BRACKET	SHEET, 0.250" THICK	HOT ROLLED STEEL
2	1	GUIDE, STOP BRACKET	SQUARE TUBING, 1-1/2" X 1-1/2", 0.250" WALL	HOT ROLLED STEEL

SkyBuilt Power, LLC

STOP BRACKET, 3-PV

SIZE D | DWG. NO. 3PV-0108 | REV 1

Fig. 34